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AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 17 FEBRUARY, 1934 NUMBER 2

TUBERCLELIKE NODULES OF EPISCLERA AND EYELIDS, BILATERAL

W. H. WILMER, M.D., LL.D., ScD.
BALTIMORE, MARYLAND

The general condition of the patient pointed to a tubercular involvement and this diagnosis was confirmed by the histological structure of the nodules. Tuberculin therapy brought about rapid relief from the general and local symptoms. The differential diagnosis is discussed. From the Wilmer Ophthalmological Institute of The Johns Hopkins University and Hospital. Read before the American Ophthalmological Society in Washington, May 8, 1933.

The following case is reported for the reason that it is unique in my experience, and presents a picture interesting in its clinical, pathological, and differential diagnosis.

Mrs. W. F. D., aged 56 years, whose general health had always been good, was first seen on Nov. 25, 1932. She complained of extreme fatigue, puffiness of eyelids, and inflammation of the eyes.

Family History. The father had died at 82 years of age. During his latter years, he suffered from glaucoma. One brother's eye was enucleated on account of a malignant growth.

Past History. Apart from the diseases of childhood, and later slight arthritis, the patient's health has been excellent. Eighteen months before examination, she noticed puffiness of the eyelids, and painless swelling over the external ocular muscles. Fifteen months later, a diagnosis was made of chronic glaucoma, right eye.

Present Illness. Six weeks ago, she consulted the late Dr. Hilliard Wood, who noted the tumors of the eyelids, and wrote: "Their nature I do not understand." He diagnosed the bulbar lesions "episcleritis." Recently, the swellings in the eyelids, and over the muscles of the eyes have increased.

Physical Examination. The general medical examination was negative except the patient was overweight and showed great fatigableness. Blood pressure was 135/80. The nose and throat examination was negative. All teeth had been removed. *Laboratory reports:* Blood. Chemistry, cytology (including differential count), and platelets were normal. Wassermann reaction was negative. Urine was negative. Phthalein excretion was 70 percent in two hours. Basal metabolism, –6. Intradermal tuberculin test was positive to 1/100 mgm. O.T.

Eye Examination. Externally, the right eye showed swelling of both lids, particularly towards the inner canthus. In the left eye, the puffiness was confined chiefly to the upper eyelid near the inner canthus. In the right lower eyelid, near the nasal margin of the orbit, a hard lump about 9 x 10 mm. could be felt with the finger. It did not involve the skin or the eyeball; it was freely movable, and could be pushed back into the orbit; but it was attached to the periosteum at the orbital margin. A smaller lump in this eyelid near the outer canthus, one in the upper eyelid near the inner canthus, and the small nodule in the nasal portion of the left upper eyelid, seemed to be attached in the same manner as the larger one (fig. 1). Over the right internal rectus, there was a nodule which began at its point of insertion and extended back 12 mm. It was about the width of the muscle, and elevated from 2 to 3 mm. It was very hard, not painful upon pressure, and seemed to be attached to the tendon and to the sheath of the muscle (fig. 2). There was a similar nodule over the right external rectus, and a long thinner one over the left superior rectus. These masses had the general yellowish-red color of an inflamed pinguecula; they

did not involve the sclera proper; the conjunctiva over them was free, but its vessels were somewhat injected. Vision of both eyes with correction of refrac-

Fig. 1 (Wilmer). Nodules of the eyelids.

tion error = 6/6. Visual fields are practically normal. The blind spots were enlarged for colors; the light sense was reduced.

Slitlamp: Right eye. The cornea shows a Staehli's line horizontal at the lower pupillary margin; at each extremity,

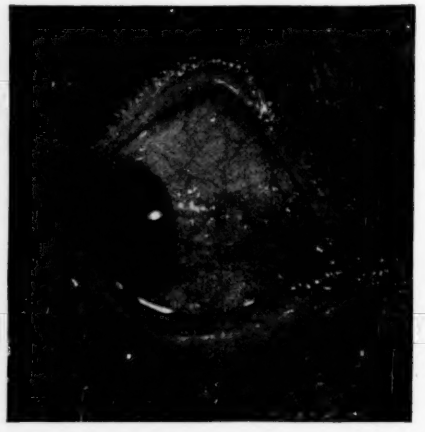

Fig. 2 (Wilmer). Nodule over internal rectus.

there is a roundish opacity in the deeper layers of the epithelial cells. The aqueous ray is normal. There is depigmentation of the pupillary border, and clumps of accumulated pigment are seen on the iris. On the nasal side of the pupillary margin, there is one well-defined Koeppe's nodule. There are a few pigment granules and some slight remains of exudation on the anterior lens capsule. The lens itself is clear, and there are no synechiae. *Left eye.* The cornea is clear except slight epithelial opacities, such as are seen after use of the tonometer. Aqueous ray is normal. There is a slight depigmentation of pupillary border. The lens is clear. Over the nodules on the right internal and external recti—at the point of insertion of the tendons—there are three or four small collections of fluid, similar in appearance to oil droplets.

Ophthalmoscopic examination: Left eye, normal; right eye, faint vitreous opacities, but the fundus is normal.

Intraocular tension: Right eye, 25.3; left eye, 18.6 mm. Hg (Schiötz).

A piece of the growth over the right

Fig. 3 (Wilmer). Nodule, lower eyelid. (x 4).

internal rectus was removed for microscopic examination. Dr. Jonas Friedenwald reported: "Specimen shows a small inflammatory nodule embedded in what appears to be normal subconjunc-

tival connective tissue. The nodule is sharply circumscribed, and consists for the most part of epithelioid cells with numerous giant cells and some surrounding lymphocytic infiltration. No caseation present. No bacilli found in growth. Impression: Tuberculosis."

Patient was put on thyroid, and also on tuberculin treatment. Two-and-a-half months later, she had lost her feeling of lassitude. The nodules upon the muscles and the eyelids had disappeared, except the one near the internal canthus of the right lower eyelid. Even this was somewhat smaller. Tonometer, right eye, 17.2; left eye, 17 mm. Hg (Schiötz). The advisability of removing the remaining growth for microscopic examination was explained to the patient. It was removed under a local anesthetic, and the wound was entirely healed within four days. (Weight of specimen, 532.1 mgm.) Dr. Friedenwald reported concerning this growth: "Tissue is typical tuberculous material. Structure very similar to the first specimen of the nodule removed from the internal rectus muscle. Many giant cells, numerous spots of caseation and large number of epithelioid cells. No tubercle bacilli were found" (figs. 3, 4, 5, 6, 7, 8).

On March 31 1933 the patient felt well. The nodules on the eyeball and in the eyelids showed no tendency to return. The glaucoma was controlled by pilocarpin; intraocular tension remained normal. So far no bacilli have been found in the sections, and the animal inoculations have been negative.

Comment

In the matter of diagnosis, this case must be differenti-

Fig. 4 (Wilmer). Episcleral nodule.

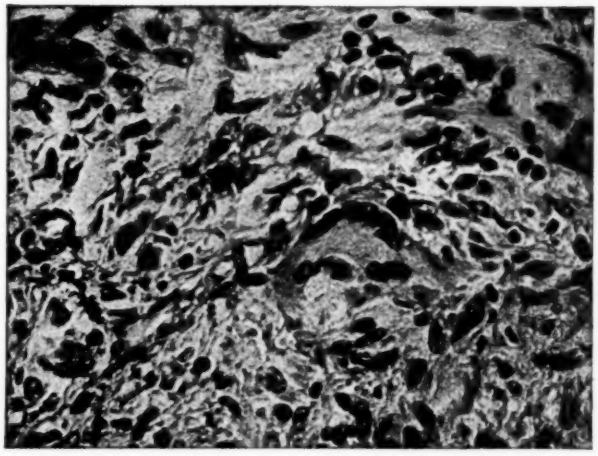

Fig. 5 (Wilmer). High-power magnification of figure 4.

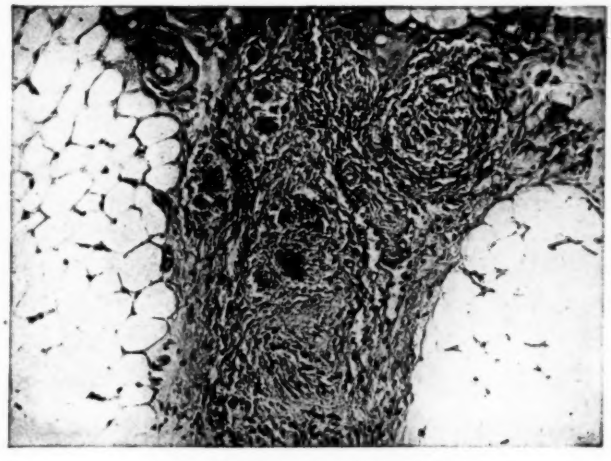

Fig. 6 (Wilmer). Lid nodule.

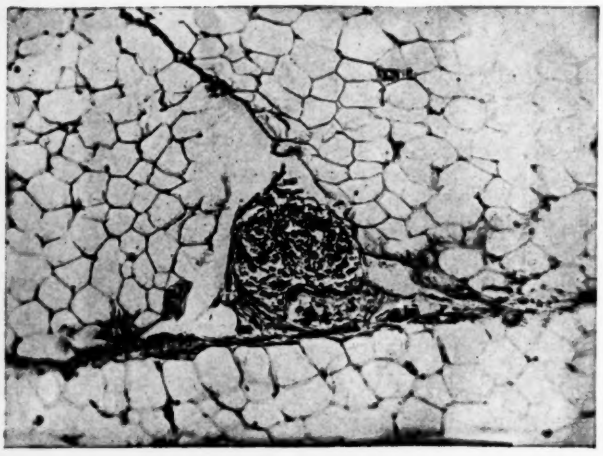

Fig. 7 (Wilmer). Isolated tubercle in orbital fat.

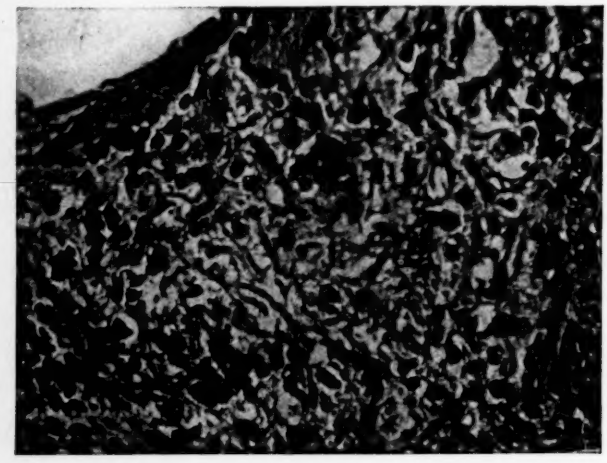

Fig. 8 (Wilmer). High-power magnification of figure 6.

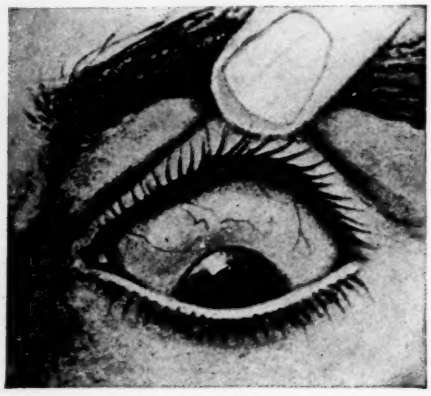

Fig. 9 (Stephenson, S.) "Brawny scleritis." The Ophthalmoscope, 1914, v. 12.

ated clinically from ordinary episcleritis, nodular scleritis, beginning gelatinous (brawny) scleritis, lymphoma, and Boeck's sarcoid of conjunctiva and eyelids.

Episcleritis and nodular scleritis. In these conditions, the episclera or sclera itself is involved. The swellings may be around the limbus and not over the muscles. Usually, there are symptoms of inflammation, pain, photophobia, lacrimation. Anterior nodular scleritis is usually due to tuberculosis. In the case of scleritis, there is often sclerosis of the cornea with active uveal involvement. In both episcleritis and scleritis, the course of the disease is usually marked by a series of improvements followed by relapses. In both of these lesions, the swellings are usually reduced in size by the use of adrenalin. In this case, there was no material reduction under the adrenalin.

Gelatinous, or brawny, scleritis is usually quite different from the case under discussion. In brawny scleritis, there is diffuse inflammation and swelling of the sclera. The swelling pits on pressure, and may hang over the cornea as in a case of lymphoma. Derby[1] states that pain is always a marked and distressing feature. Sydney Stephenson[2], however, speaks of brawny scleritis as a painless inflammation of the anterior segment of the globe (fig. 9). Verhoeff[3] calls attention to the very important fact that early in gelatinous scleritis, "the infiltrated recti tendons may simulate scleritic nodules." Oatman[4] also describes a large deposit in the tendon of the external rectus muscle in a case of brawny scleritis. Verhoeff says that microscopically there is diffuse plasma cell infiltration, later formation of granulation tissue, necrosis, peri- and endarteritis; and that giant cells may or may not be present. In his opinion the pathologic appearance suggests a syphilitic origin of this disease.

Lymphomata may involve the eyeball, or the eyelids, or both. Pascheff[5] divides these hyperplasias into four clinical forms according to their blood picture, their morphology, and their location. The histological structure of all of these forms is practically identical. Begue[6] has described the case of a 41-year-old man who had a growth on the right lower eyelid and a lymphomatous mass occupying the anterior segment of the left eye. Its histological examination corresponded to the appearance of a case reported by Dupuy-Dutemps[7], and the diagnosis of lymphoma was thus confirmed. Those cases of lymphomata in the conjunctiva that I have seen, have usually appeared as prominent, even masses—transparent, edematous, not nodular, with much enlarged conjunctival vessels. (Figure 10 illustrates such a condition in a 47-year-old woman.) The tissue of these lymphomatous masses consists of an accumulation of lymphocytes; it is very vascular and it contains many capillaries. Recently Shannon and McAndrews[8] have reported a similar case.

Fig. 10 (Wilmer). Lymphoma of conjunctiva.

Boeck's sarcoid is of great interest owing to the resemblance of its histological structure to that of a tuberculoma. In 1899, Boeck[9] described a case of multiple benign sarcoid of the skin in a man 36 years old. Since then, many cases of this interesting disease have been described. Kissmeyer[10] said that the conjunctiva was not frequently affected, and that when it was affected, the tarsus was usually involved. He reported that out of twenty cases, the conjunctiva was involved in three, and the iris in five. Blegvad[11] found a tuberculous type of iritis or iridocyclitis in 10 percent of all sarcoid cases. Ginsburg[12] found the records of eight cases of skin sarcoid in negroes, and he described an additional one. In two of these instances the skin of the eyelids was affected, but not the conjunctiva. In regard to the subcutaneous nodules, this author stated: "The histological changes approximate more closely those found in the more common forms of tuberculosis of the skin than in Boeck's sarcoid."

In spite of the great similarity of the microscopic appearance of a tuberculous nodule and a sarcoid, the clinical appearance is quite different. In the skin sarcoid, the skin itself is involved; there may be changes in the lymphatic glands, mucous membranes of the nose and throat, and in the tonsils. There are often cystic changes in the small tubular bones. Sarcoid of the conjunctiva appears in the form of many minute follicelike bodies which vary in size from a pinpoint to a chalazion. However, the

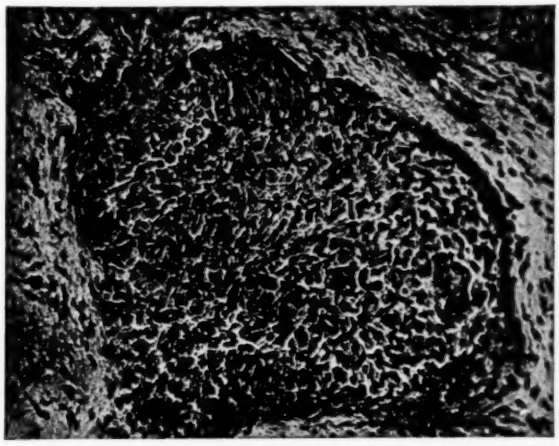

Fig. 11 (Seefelder). Boeck's sarcoid of conjunctiva. Microscopical section. Arch. f. Augenh, 1932, v. 105.

subcutaneous form of sarcoid (type Darier-Roussy) is not unlike a tuberculoma. The histological structure of sarcoids consists of epithelioid cells, a few giant cells, and lymphocytic infiltration (Blegvad). But Kissmeyer calls attention to the fact that there is never any tissue necrosis. The microscopical appearance of sarcoids is well shown in Seefelder's[13] case. (See figure 11. Mostly epithelioid cells; giant cells scarce; round cells in varying amount in periphery).

Many observers think that sarcoids are really tuberculous lesions; but that due to acquired specific allergy, the tuberculin test is often negative. Igersheimer[14] quotes Jadossohn's opinion that the greatest number of cases of Boeck's sarcoid are tuberculous. Others think that the lesions are not tuberculous because bacilli are rarely found in the sections; and because the reactions to tuberculin and to animal inoculation are negative. However, in many tuberculous lesions the bacilli are not found because they are relatively few in number, and may easily escape detection. Sometimes the result of the animal inoculation is reported negative when sufficient time has not elapsed for infection to occur. Kyrle, quoted by Mylius[15], states that a later stage of immunity evidently develops, because in early skin lesions he found bacilli, and obtained a positive inoculation. In discussing the relation of tuberculomata to skin sarcoids, a report of Reis and Rothfeld[16] is interesting. In 1931, the authors described a case of the type Darier-Roussy in a 16-year-old girl. The cheeks, extremities, and both eyes were involved. The autopsy revealed advanced general tuberculosis. In this article the authors called attention to the fact that tuberculoids may complicate skin sarcoid.

Tuberculomata. Several observers have reported tuberculous nodules of the conjunctiva, episclera, eyelids, and orbit. Michaïl[17] described a rather large, rectangular tuberculoma of the left lower eyelid. The growth was adherent to the margin of the orbit, and one of its prolongations extended to the apex. Davids[18] described a tuberculous nodule the size of a pea, which involved the insertion of the internal rectus. He quoted Reis's case in which a large tumor disappeared after one injection of tuberculin. He also recited a case of Junius in which the tuberculoma disappeared under the use of tuberculin, but returned later. It healed rapidly under ultraviolet light treatment. Junius believes that tuberculosis of the conjunctiva is rare, and that these cases are local manifestations of latent tuberculosis in some other organ. Junius advises operative treatment followed by the use of ultraviolet light. Schöpfer[19] reported the case of a 53-year-old man. In this instance there was a small tumor in the upper, and one in the lower, right eyelid, "probably of endogenous matastatic origin." One was removed; the other one was treated by x-ray. Both were cured.

Summary. In the case I have reported, the patient experienced the great lassitude so common to the toxemia of tuberculosis (Head[20]); and she reacted positively to 1/100 mgm. of old tuberculin. The Wassermann reaction was negative. There were no signs of lymphoid involvement, nor of any of the accompanying general symptoms of sarcoid. The slight signs of a past uveal inflammation with a Koeppe's nodule, suggested a mild tuberculous process. The increased intraocular tension might well have been the result of the previous uveal inflammation. The macroscopical appearance and the histological structure of the nodules which were removed, were typical of tuberculosis. Under the use of tuberculin, the general malaise and all of the local lesions disappeared quickly and, it seems, permanently.

Conclusions. The similarity in histological structure of tubercles and sarcoids is significant of related etiology.

Certain affections that might be confused with tuberculomata of the eye and of the eyelids, have been discussed; and reasons have been given for considering the lesions in this patient as tuberculous.

Here, the origin of the local manifestation seems to be from a tracheo-bronchial infection through the blood stream, the organisms having a predilection for connective and fibrous tissues.

This patient presents an instance of a local tuberculous process such as would be expected in one in whom the resistance is high, the allergy low, and the invading bacilli few in number and avirulent.

The indications for treatment are attention to the general health and hygiene, and the administration of tuberculin. Surgery and radio therapy may be necessary in addition if the nodules are very large, and the patient's resistance low.

The Wilmer Ophthalmological Institute.

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Discussion. DR. F. H. VERHOEFF, Boston: To me this is an intensely interesting case. I have never seen one like it. I have seen several cases of Boeck's sarcoid, but in none of these was the conjunctiva or orbit involved. In Boeck's sarcoid the striking feature is that with so definite a tumorlike nodule there is practically no congestion. The histologic picture of the skin nodules in this case is exactly like Boeck's sarcoid, but the occurrence of caseation in the orbital nodule is not characteristic.

Some investigators believe that Boeck's sarcoid is a tuberculous condition; others assert that it is not. From the description that has been given I would conclude that this was really a case of Boeck's sarcoid involving the eye, and that the evidence from this case shows very strongly that Boeck's sarcoid is a tuberculous condition.

DR. ARNOLD KNAPP, New York: The recital of Dr. Wilmer's interesting case reminds me of a patient, a woman past middle age, whom I saw some years ago. She had a number of multiple tumors of the lid and in the underlying orbit, and a diagnosis of lymphoma was made. The reason I speak of this case in this connection is to point out the fact that this woman was a definitely hyperthyroid individual and after the administration of thyroid ex-

tract the swellings disappeared entirely.

DR. CONRAD BERENS, New York: I am not certain as to whether Dr. Wilmer said that animal experiments were made, and whether or not tubercle bacilli were found in the tissues. Information in regard to these two points would be appreciated.

DR. W. H. WILMER, closing: Dr. Verhoeff mentioned various sarcoid types. Many authorities believe that the subcutaneous form of sarcoid is tuberculous. Clinical observation and microscopic examination have convinced me that this is true.

In my case no bacilli were found in the sections. Animal inoculation was negative. Usually, in these tuberculous masses, bacilli are few and may easily be overlooked.

In regard to Dr. Berens's questions, I will repeat: animal inoculation was negative, and no bacilli were found.

The fact that there was distinct caseation of the orbital nodule does not agree with what we know of sarcoids, but I believe that subcutaneous sarcoids and tuberculous nodules are practically identical.

BLOOD-CULTURE STUDIES IN IRITIS

EUGENE F. TRAUT, M.D.
CHICAGO

Pleomorphic streptococci were found in the blood of five patients with acute iritis, using the author's modification of Clawson's technic. The organisms cultured from the blood of patients with chronic iritis were also pleomorphic and resembled morphologically and culturally those isolated from patients with chronic arthritis. Two patients were experiencing their first attack of iritis, three had the recurrent form. Two had had frank arthritis and in three there was a preceding infection of the upper respiratory tract. From the John McCormick Institute for Infectious Diseases.

The eye is a surface organ reflecting changes in the body, not "eye diseases" but diseases of the system as expressed by the eye. In a recent review of the literature on disease of the uveal tract it has been gratifying to see how ophthalmologists are utilizing more and more the progress made in general medicine. Modern ophthalmologists are correlating their experiences with the results of the biochemist, the anatomist, and the bacteriologist.

Workers today have given "rheumatism" a broad meaning. Rheumatism as defined by the American Committee for the Control of Rheumatism is applied not only to rheumatic fever and the various forms of chronic infectious arthritis (with the exception of those due to tuberculosis, syphilis, and gonorrhea), but includes myositis and fascitis, endocarditis, pericarditis and myocarditis, bursitis, diseases of the nervous system as chorea and other forms of encephalitis, infectious neuritis, and even tonsillitis. Many of these infections may be concomitant and in all the streptococcus is thought to play an important part. In this rheumatic group, I have always placed endogenous iritis if definite evidence of lues, tuberculosis, gout, gonorrhea or diabetes was found neither in the eye nor in the rest of the body. In my clinic I frequently have referred to the usual recurrent nonspecific iritis, especially as it occurred in my arthritic patients, as "rheumatism of the eye."

Clawson[1] devised a method of culturing the blood which varied from the older methods chiefly in persistent incubation of the clot after discarding the serum. The serum is recognized to contain antibodies often effective in preventing the growth of bacteria in a visible form. His technic yielded bacteria in suspected cases of blood infection where more cursory and currently used methods had failed. He succeeded in finding streptococci in the blood in rheumatism. Cecil[2] used this method in studying chronic arthritis. In 27, or 71 percent, of 38 patients with chronic arthritis in whom blood cultures were attempted, I demonstrated organisms belonging to the streptococcus family[3]. The bacteria

isolated were pleomorphic, appearing as beaded bacilli and cocci in pairs or short chains. They were usually indifferent to blood agar; neither hemolytic nor green.

Ninety percent of these bacteria grew as cocci in chains, on repeated transfer. Because I associated iritis with rheumatism I applied my technic of blood culture in arthritis to five cases of acute iritis.

So far as the cause of iritis is concerned, writers seem divided into those believing that most cases of so-called rheumatic iritis are really tuberculous, and those upholding the doctrine of focal infection. Those favoring the tuberculous etiology are Viennese as J. Meller[4] and R. Meller[5] for whom Ernst Löwenstein does the bacteriology, and Finnoff[6] in America. The most prominent supporters of the theory of streptococcal focal infection are Rosenow[7], Brown[8], Irons[9], and Benedict[10] in America. In each camp the opinions of the other have but little weight.

Previous to Löwenstein the proof of actual Koch-bacillus infection in patients with so-called tuberculous iritis was lacking. Animal inoculation or culture of inflamed tissue gave negative results. However, under Löwenstein's tutelage, Urbanek and R. Meller claim to have demonstrated a tuberculous etiology of 90 percent of all inflammations of the uveal tract. Meller emphasizes that the tubercle bacilli *themselves* are present in the uveal tract and that the uveitis is *not* the result of a toxin produced in a distant focus. Löwenstein's work awaits confirmation.

I can find no record of the demonstration of streptococci in the circulating blood in acute exacerbations of chronic or recurrent iritis. In 1916 Brown, Irons, and Nadler[8] produced iritis in rabbits by injecting intravenously cultures of a hemolytic streptococcus isolated from the tear duct of a patient with acute iritis. Rosenow[7] and Benedict[10] demonstrated the tendency of streptococci from the teeth, tonsils, and prostate of patients with iritis to produce iritis in animals, further evidence of Rosenow's theory of elective localization. Kolmer[11] has recently expressed his adherence to the streptococcal origin of most cases of iritis.

Kronfeld[12], as well as Gifford[13], has carefully analyzed the modern literature. They agree that tuberculosis may play a more important part in Central Europe than in America. Kronfeld adds that he gives far more consideration to extraocular evidence of tuberculosis than to the presence of infected teeth or tonsils.

All ophthalmologists stress the importance of the history in elucidating the cause of iritis. The supporters of the tuberculous etiology emphasize that it is not necessary for the extraocular tuberculosis to be active. As to the history, it seems to me that gonorrhea, at least in males, is so frequent and so commonly denied or forgotten as to make the confession of gonorrhea of as little value as the history of some of the symptoms of rheumatism. What adult has not had lumbago or rheumatic pains somewhere? Then apical scars are so common in the lungs of city adults that some tuberculosis, of some form or other, can practically be assumed in everybody. Goldenburg[14] showed that of all patients with clinical tuberculosis at the Chicago Municipal Sanitarium, only 2 percent had affections of the uveal tract. In 1931 Irons[9] made the significant statement that evidence of present or past tuberculosis infection does not alone warrant the conclusion of tuberculous etiology in a given case of iritis. Kolmer, Irons, Benedict, and Kronfeld have postulated that there must be a bacteremia. The failure of cultural attempts to demonstrate organisms has been laid to the scarcity of bacteria in the blood or to bacteria appearing in the blood only at times.

In my technic 20-30 c.c. of blood are withdrawn under aseptic conditions. The blood is allowed to clot. A portion of the serum is centrifuged and the centrifugate sown into brain or liver broth, dextrose broth, and upon chocolate agar plates. Brain broth and glucose broth are also seeded with portions of the clot. Subcultures on plates and in broth are made at intervals of 7 to 10 days. If there is no growth within 12 weeks the cultures are discarded.

Dr. Georgiana D. Theobald allowed me to culture the blood of a man of 27 years. He had had acute iritis 7 days. There were no previous attacks. His general health was good. There were no abnormalities in the tonsils, teeth, or lungs. The patient's mother died of tuberculosis. After 4 days' incubation the sediment of the serum in glucose broth yielded green streptococci. On subculturing for three months the greening organisms became and remained definitely hemolytic. The interior of a dead tooth yielded nonhemolytic streptococci. The patient refused treatment. He still has iritis in a subacute form.

Through the courtesy of Dr. Thomas D. Allen I took blood from a man of 40 years who had had rheumatoid arthritis of the spine for 15 years. He had had acute iritis for the first time eight years ago. The iritis had recurred three times yearly up to two years ago. The present attack had lasted 2 weeks. From the serum sediment in dextrose broth and in phosphate broth nonhemolytic organisms grew in 48 hours. These were at first distinctly bacillary. On subculturing in fresh, whole, human blood they became greening cocci in chains. According to Dr. Coote, who followed the patient, an uneventful recovery occurred after extraction of pulpless teeth.

Through the courtesy of Dr. R. E. Johannesen I was able to obtain blood from a man aged 50 years. He had had iritis for one week. His first attack had occurred 35 years ago. The iritis had recurred about every four years in the fall and was often preceded by a head cold. He had never had rheumatism. He has two healthy children. On the seventeenth day the clot cultured in phosphate broth yielded anhemolytic colonies of pheomorphic streptococci. This man did not return to the dispensary.

Another of Dr. R. E. Johannesen's patients was a man of 24 years. He had had a chancre six months ago. His iritis set in suddenly with a cold in the head, two weeks before his first visit. His joints had been aching and tender for this two-weeks' period. His eye was very painful. He had not had iritis before. His Wassermann reaction was four plus. After incubating the clot in brain broth for 21 days nonhemolytic, pleomorphic cocci were isolated. A few days later the cultures of the other portions of clot yielded identical organisms. Dr. Johannesen reports that the iritis has disappeared. He still has an optic neuritis.

A patient of Dr. Thomas D. Allen was a woman aged 45 years, who had had an acute iritis for two weeks but no previous attacks. The general condition was good except for chronic tonsillitis and two pulpless teeth. The lung findings were negative, the temperature 99°F.

Subcultures from the clot in brain broth and simultaneously from the clot in dextrose broth yielded small, gram-positive, nonhemolytic bacilli. These were the small bacilli with polar bodies or the diplococci so frequently encountered in my cultures of the blood in chronic arthritis.

Unfortunately four of these patients were of the migrating, dispensary type and the fifth, refusing treatment, dropped from observation. We had no opportunity to repeat the culture of their blood. In this work it has been the practice to make cultures of blood from afebrile, presumably uninfected patients and to subject these cultures to the same manipulations of opening and subculturing as the cultures from rheumatic and other patients *suspected of being positive.* Of the five controls, one, an old man with peptic ulcer, had streptococci in his blood stream. No bacteria grew from the culture of the 20 controls for the studies of blood cultures in arthritis. It is surprising that I did not get more bacteria from the blood of the controls since they were chosen from bed-ridden hospital patients.

The organisms cultured from the blood of patients with chronic iritis resemble morphologically and culturally those from patients with chronic arthritis. They are pleomorphic. On isolation they grow as pin-point, colorless colonies often discoverable only with the colony microscope. If grown in broth, they show a faint filament in the bottom of the culture tube, 24, 48, or often as late as 72 or 96 hours after subculture

and incubation. Morphologically bacilli, elongated cocci, or diplococci are found in the same field. Part of the organisms usually retain the Gram stain. After repeated subculture they become strongly gram-positive and grow in short chains.

So far it has not been possible to establish or disprove the immunological identity of the organisms from iritis and those from arthritis. The arthritics show far less opsonic and bactericidal ability for the iritis streptococci than for the arthritic strains on repeated tests.

Rabbit blood with a high agglutinin titer for arthritic streptococci failed to agglutinate one of the iritis strains. This nonhemolytic coccobacillary form from iritis was not agglutinated by the serum of the five iritis patients. This failure of the host's serum to agglutinate its own flora is frequently seen in arthritis. There is a growing tendency to ascribe little importance to the presence or absence of streptococcal agglutinins.

One of the iritis strains, a nonhemolytic streptococcus, grew in bile. This is a characteristic of bacteria inhabiting the gastrointestinal tract.

Summary: Using a modified technic developed by Clawson for studying the streptococci in the peripheral blood, five patients with acute iritis yielded pleomorphic streptococci. These organisms resembled morphologically and culturally those isolated from blood of arthritic patients.

Two of the five patients with iritis had had frank arthritis. Three of the patients had had recurrent attacks of iritis. In two the disease followed acute upper respiratory disease. Acute upper respiratory disease had preceded the iritis in a patient with lues. Whether the lues was a factor in producing the iritis is a moot point not easily settled even by a favorable outcome following antiluetic medication.

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THE CLINICAL SIGNIFICANCE OF RETROBULBAR AND OPTIC NEURITIS

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Retrobulbar and optic neuritis are manifestations of some systemic condition and should therefore be recognized by the internist, pediatrician, obstetrician, neurologist, and others, as well as by the ophthalmologist. A painstaking history of the disease should be elicited to uncover the hidden etiology. Even then there are cases to which no definite etiology can be assigned. The writer does not find that nasal accessory sinuses or teeth are often the cause. From the Section on Ophthalmology, The Mayo Clinic, Rochester, Minnesota. Read before the 112th annual meeting of the State Medical Society at Kalamazoo, September 13-15, 1932.

An ophthalmic syndrome due to retrobulbar and optic neuritis has been definitely established clinically. The subjective symptom is blurred vision, which may be either acute or chronic. The acute form is characterized by the suddenness with which vision is disturbed. In severe cases, all perception of light may be abolished within a few days, or there may be sudden and momentary loss of vision, occurring many times a day. The disturbance of vision may be rapidly progressive for a short period, followed by definite improvement, regardless of the actual cause or the therapeutic measures used. The chronic form is characterized by such gradual diminution of central vision that the patient is unable to state definitely when the vision really became affected. At first, average-sized type can still be read, but the ability to read gradually fails. Vision at dawn or dusk, or on cloudy days, is much better than in the bright daylight. The visual symptoms of either the chronic or acute form may be accompanied by severe headache or by dull pain in the orbit. In other cases, pain can be produced by pressure on the globes or on moving the eyes.

Ophthalmologic examination reveals diminution of the central vision in one or both eyes. Depending on the extent of the loss of vision, the pupils may be dilated and respond poorly to stimulation by light. In the more severe cases, Wernicke's retrobulbar pupillary reflex can be demonstrated. In acute retrobulbar neuritis the ophthalmoscopic examination reveals nothing abnormal, but pallor of the discs is usually present in the more chronic forms. In cases of definite optic neuritis, edema of the disc with associated venous engorgement, hemorrhages, and exudates, is observed, while in the chronic type, postneuritic atrophy may be present. The characteristic feature necessary to complete the ophthalmic syndrome is the central scotoma, or peripheral-field defects continuous with central scotomatous defects. The field defects may present many bizarre pictures, depending on the severity and chronicity of the neuritis, but the characteristic central visual defect must be present to establish the definite syndrome produced either by retrobulbar or optic neuritis.

In general, the prognosis in cases of retrobulbar neuritis is good, whereas that in cases of optic neuritis is poor. In both types this statement depends on the etiology and the chronicity of the condition. The disease may recur after a lapse of many years.

Although the ophthalmic syndrome is well established, the clinical significance of retrobulbar and optic neuritis is not clear. Much of the voluminous medical literature in the last fifteen years has confused, rather than clarified, the clinical predicament in which physicians are now situated. Different waves of enthusiasm have been experienced as to the etiology, with the greatest stress being placed on multiple sclerosis and sinusitis. Like all of the intraocular conditions, retrobulbar or optic neuritis is rarely local, but usually originates elsewhere in the body. Therefore, a complete general and neurologic examination, including examination of the spinal fluid, is necessary before any definite etiologic factor can be elicited. In a certain number of

cases the most comprehensive examination possible will reveal nothing definite as to the cause, and a certain percentage of cases will necessarily be unclassified. It is in this latter group that some abnormal or pathologic clinical condition is usually given as the cause, only to be shown later, on a recurrence of the condition, to have been merely coincidental. Therefore it is of greatest importance, not only to the ophthalmologist, but to every physician engaged in treating internal diseases, to become acquainted with the clinical significance of retrobulbar and optic neuritis.

It is impossible to review the literature completely or to present this subject in its entirety. I am, therefore, presenting selected interesting cases from my own clinical experience at The Mayo Clinic, in an effort to show the need for thoroughness in making the clinical examination in order to ascertain the definite etiology.

Multiple sclerosis

By far the most common cause of retrobulbar and optic neuritis, in my experience, has been multiple sclerosis. More than 500 definitely proved cases of multiple sclerosis have been observed at the clinic, in about 15 percent of which disturbance of vision was the primary episode; in an additional 35 to 40 percent disturbance of vision was a second or third episode. Retrobulbar neuritis was the syndrome most commonly observed. The prognosis is usually good, but recurrences are common. A carefully taken clinical history is of greatest importance in establishing previous visual episodes, as some of these are fleeting and not severe enough to have impressed the patient that the episode had any bearing on his present condition. Illustrative cases follow:

Case 1. Retrobulbar neuritis as the first and second episode. A girl, aged eighteen years, first came to the clinic in 1925 because of rapidly failing vision in the right eye for two previous days. Other than this she had always been well. The ophthalmologic examination revealed vision of ability to count fingers with the right eye, and ability to read of 6/5 with the left eye. The fundus of each eye showed structurally full discs, but was otherwise normal. The perimetric fields revealed a large cecocentral scotoma in the right eye. The left eye was normal. General and neurologic examinations, including a roentgenogram of the sinuses and head, were negative except for infected tonsils and three infected teeth. A tentative diagnosis of multiple sclerosis was made.

The patient was given a series of pilocarpine sweats with resulting improvement of vision to 6/5 in each eye and normal fields. The right disc was slightly pale. Following this treatment the tonsils were removed and later the three teeth were extracted elsewhere.

The patient returned to the clinic in 1927 because of blurred vision in the left eye for two days. The ophthalmologic examination disclosed vision of 6/5 of the right eye and 6/20 of the left eye. The fundus of both eyes appeared to be the same as two years previously, namely, structurally full discs with slight pallor of the right disc. The perimetric fields revealed relative central scotoma in the left eye. The general examination was negative, but the neurologic examination now revealed the tendon reflexes to be hyperactive. There was some incoordination of the hands. The Chaddock reflex was positive. The spinal fluid was normal except for seven small lymphocytes.

The patient was again given a series of pilocarpine sweats with resulting rapid return of vision in the left eye to 6/5, and disappearance of the relative central scotoma.

In February, 1930, the patient again returned to the clinic because of numbness of the hands, feet, and left side of the face. The vision was 6/5 in each eye. The neurologic examination was practically the same as in 1927. At this visit she was given intravenous typhoid treatment. During the treatment right facial paralysis developed. Convalescence was uneventful, and all the neurologic symptoms disappeared. Since that time she has had transitory episodes of numbness of the hands, and temporary blurring of vision, too fleeting to necessitate any form of treatment.

Case 2. Optic neuritis as the second episode. A girl, aged nineteen years, was first examined at the clinic in 1922, following her application as a professional blood donor. Examination was negative and she was used as a Group 4 donor. In 1927 she noticed weakness of the left arm and leg when getting out of the automobile at her home. General examination was negative, but the neurologic examination revealed moderate left motor weakness of the arm and leg. The ophthalmologic examination was negative. Examination of the spinal fluid revealed twenty-one small lymphocytes and a zone 1 colloidal gold curve, 5555555100. A diagnosis of early multiple sclerosis was made and a series of intravenous injections of arsphenamine was given with resulting improvement of her condition.

Eight months later the patient returned to the clinic because of blurred vision of the right eye for the previous week. Examination revealed the vision of the right eye to

be 6/15, and of the left 6/7. Examination of the fundus revealed mild optic neuritis with edema of about 1 diopter. The perimetric fields showed only a small isle of temporal vision in the right eye, with loss of central fixation; that of the left eye was normal. The neurologic examination was essentially negative except that the spinal fluid again revealed twenty-two small lymphocytes, and a colloidal gold curve, zone 1, 555555330. A series of pilocarpine sweats was given with resulting progressive improvement in sight, the fields improving through successive stages of a cecocentral scotoma, central, and relative central scotoma to normal in six months.

In this case the record of normal eyes on the patient's first visit was definite, although examination of the spinal fluid and neurologic examination were positive for multiple sclerosis. On the patient's second visit unilateral optic neuritis was present, and the spinal fluid was the same as before, but the neurologic examination was essentially negative. There have been no recurrences since the patient's second visit.

Case 3. Remission of nine years' duration between the episodes of retrobulbar neuritis. A man, aged thirty years, first came to the clinic in 1921 with the complaint that vision in the right eye had been failing for two weeks. One year previously he had noticed numbness of the right arm and leg for about two weeks. This cleared without treatment and had not recurred. The ophthalmologic examination revealed ability to count fingers with the right eye, and vision of 6/4 in the left eye. Ophthalmoscopic examination revealed slight blurring of the disc, but was otherwise negative. The perimetric fields revealed a large cecocentral scotoma in the right eye. General examination was negative except for three infected teeth which were removed. Potassium iodide was prescribed to be taken internally at home, and one month later a letter stated that the vision in the right eye had improved rapidly.

The patient returned in March, 1930, because of failing vision in the left eye of five days' duration. Since his previous visit to the clinic in 1921 he had had no symptoms. The ophthalmologic examination now revealed vision of the right eye to be 6/6, while that of the left eye was ability to count fingers. The fundus of both eyes was normal. Perimetric fields revealed only a temporal isle of vision remaining, with loss of central fixation in the left eye; in the right eye was a small paracentral relative scotoma situated above the fixation point, the residue of the patient's previous mild optic neuritis nine years before. The general and neurologic examinations were negative. The spinal fluid revealed two small lymphocytes. After a course of intravenous typhoid treatment the vision and fields improved to normal except for the permanent paracentral scotoma in the right eye.

The special interest in this case is the definite nine-year interval, free from symptoms, which was not due to any specific treatment. It is an example of what can happen in multiple sclerosis, and should make physicians conservative in concluding that any treatment they may have used really increased the time interval of the remissions characteristic of this disease.

These three cases are typical of multiple sclerosis from the ophthalmologic standpoint. As a rule the vision improves regardless of the treatment employed. The patients in the first and second cases recovered following pilocarpine sweats as the therapeutic measure, and in the third case the first visual disturbance improved following the extraction of an infected tooth. Interestingly enough, there was a remission of nine years' duration. If further knowledge of the case had not been obtained this could be erroneously interpreted. At least it is of sufficient significance to suggest great conservatism in regard to prognosis and treatment in any form. Early treatment, in the form of pilocarpine sweats or intravenous injections of foreign protein, is instigated with the hope of rapid recovery with less residual injury and perhaps longer periods of remission. So often, however, patients who wish to be treated at home write, stating that vision has returned to normal without treatment, and ask if the treatment will prevent future episodes. This is a question best answered, perhaps, in the negative. In more than 60 percent of these cases intranasal sinus operations have been performed because of the disturbance in vision, with varied success, the condition being usually coincidental, if present, and of no more significance than the infected teeth in the first and third cases.

According to available data[10], multiple sclerosis is a rare disease, afflicting about nine persons in each 100,000 of population. The disease is usually insidious in onset and appears chiefly in the second and third decades of life. Remissions of single symptoms and signs are common, but rare for all

symptoms and signs. Striking and long remissions occur. The most common symptoms of onset are motor or sensory disturbances of the lower extremities, and visual disturbances, including diplopia and central scotoma. The chief clinical causes of death are pyelonephritis, septicemia, pneumonia, and intercurrent infection. Examination of the spinal fluid usually reveals an increase in the number of cells, varying from 1 to 50, rarely more. The colloid gold curve in a certain percentage of cases is of the zone 1 type, signifying parenchymatous degeneration. General paresis is the only other disease that produces such a curve; the latter can be distinguished by the serologic tests for syphilis.

Meningo-encephalitis

The next most common cause of retrobulbar and optic neuritis is meningo-encephalitis. This disease usually follows some acute or subacute general infection. The ophthalmologic picture is the same as in multiple sclerosis, except that optic neuritis is the more common condition of the fundus. It is unlike multiple sclerosis in that it does not usually recur, but the episode is of longer duration. The condition of the spinal fluid verifies the diagnosis, chiefly in the marked increase of cells. The prognosis is more serious, and usually some injury to vision persists. Illustrative cases are given.

Case 4. Unilateral optic neuritis. A boy, aged thirteen years, came to the clinic because of failing vision of the right eye, which had been noted two weeks prior to his admission. Six weeks before, the vision was apparently as good as that of the left eye as he had been hunting and was able to see to shoot with the right eye. In this interval ending two weeks before admission he had not noticed any decrease of vision. Two weeks before he had complained of slight headaches around the orbit. He had had headaches for one week the previous winter. These headaches were moderate and there was no associated vomiting, but he was unable to attend school. Two weeks before admission headaches became severe in the right frontal region, associated with poor vision in the right eye. There was no vomiting and headaches had not persisted.

Ophthalmologic examination revealed ability to count fingers at 6 inches with the right eye; vision in the left eye was 6/12. The right pupil was larger than the left. The margins and adjacent retina of the right disc were edematous and somewhat raised. The edema seemed to extend out into the retina. The veins were full. The cup of the disc was almost obliterated. The macular region was negative. Examination of the left eye was negative except for a slight pallor of the disc and fullness of the veins. Fields at this time revealed a small isle of temporal vision for the right eye, and normal fields in the left eye. The patient's general condition was satisfactory. Neurologic examination was objectively negative. Examination of spinal fluid revealed four small lymphocytes. A diagnosis of unilateral optic neuritis was made.

The patient was sent to hospital for a series of eight pilocarpine sweats on alternate days. Fields in the right eye taken at time of dismissal three weeks later improved to a large cecocentral scotoma with normal form fields. The fundus of the left eye was practically normal; in that of the right eye there was slight residual edema of the disc with some pallor.

The patient returned three years later complaining of slight general adenopathy. He said vision had improved steadily and in six months it was normal. Cervical adenopathy was marked, greater on the right than on the left. The lymph nodes were firm and discrete; those in axilla and groin were smaller. The patient had a slight rise in temperature. Smears taken at this time disclosed infectious mononucleosis. Vision in the right eye was 6/10 and in the left 6/6. The fundus of the right eye showed marked pallor of the disc with some blurring; that of the left eye was normal. Fields in the left eye were normal. In the right eye there was an enlarged blind spot. The patient's improvement was considered satisfactory from an ophthalmologic standpoint.

Case 5. Bilateral optic neuritis. A man, aged forty-two years, came to the clinic in May, 1929, because of marked loss of vision of both eyes. In 1918 he had had influenza, but recovered completely. During the last year he had felt listless, had lost weight, and had suffered from an occasional headache. Since the beginning of the year he had had a severe "cold" which had not cleared. In the middle of March vision began to fail, and the patient had attacks of vertigo. Roentgenograms of the head at that time revealed thickening of the bone over the right frontal sinus. The external frontal sinuses were operated on in April. Vision did not improve. The patient became restless, and irritable, and severe morning headaches developed. Vision continued to fail, and a series of pilocarpine sweats, with large doses of sodium salicylate was given. No improvement followed and the patient had been advised that nothing further could be done.

When the patient arrived at the clinic vision was reduced to ability to perceive light with each eye. Ophthalmoscopic examination revealed opacities on the posterior surface of the lens, and numerous vitreous opacities. These partially obscured the fundus of both eyes, but definite optic neuritis was visible,

characterized by edema of each disc with marked venous engorgement associated with hemorrhages and exudates. The fields showed a small isle of temporal vision in each eye. Complete general and neurologic examinations were negative, except for ninety-nine small and five large lymphocytes in the spinal fluid.

Following a course of intravenous typhoid treatment, the fields improved to a large central scotoma with normal form fields in the right eye, and a nasal hemianopsia with loss of central fixation in the left eye. The ophthalmoscopic examination was practically the same as the first one, except that edema of the discs had subsided somewhat.

The patient returned to the clinic August 20, 1929, two months later. Vision had improved to 6/60 in each eye. He had gained 20 pounds in weight and felt much better. The ophthalmoscopic examination was practically the same, except that vitreous opacities were less numerous. Spinal puncture revealed twelve small lymphocytes, which was a marked reduction over the previous examination. Another course of intravenous typhoid treatment was instituted. The sight improved steadily during this period, and at the time of his dismissal vision was 6/10 in the right eye and 6/15 in the left. The fields were normal for form, but a bilateral small central scotoma persisted.

The patient again returned January 6, 1930. At this time vision in the right eye was 6/6 and in the left eye 6/10. He could read J. 0.50 with each eye. The fundus of both eyes revealed residual fullness of each disc, and arteriosclerosis of the secondary type with a few areas of old chorioretinitis. A few opacities on the posterior capsule of the lens still were present. The fields were normal in each eye. He was examined October 10, and the vision was 6/6 in the right eye, and 6/7 in the left. The fields were normal, and the fundus about the same as in January, 1930. Further treatment was not instituted, and the patient has remained well.

These two cases are interesting in that the visual disturbance persisted after all active treatment was finished. This is more or less typical of optic neuritis. Repeated courses of intravenous treatment may be necessary to accomplish recovery, but the usual gain is worth the effort. Case 5 clearly demonstrates that ultimate success can be obtained in some of these conditions. But as a group, residual injury to vision is not uncommon.

Encephalitis periaxialis diffusa

This clinical syndrome was described by Schilder in 1912. The ophthalmologic picture may be that of retrobulbar or optic neuritis. Two such cases have been observed at the clinic. Clinical diagnosis is difficult, especially in acute fulminating cases. Observations concerning these cases have been published by Shelden, Doyle, and Kernohan[8]. In the first case a syndrome of retrobulbar neuritis was present, in the second case acute bilateral optic neuritis developed less than two months after childbirth. Optic neuritis due to lactation was suggested, but the neurologic observations were sufficient to make a diagnosis. Although this clinical syndrome is rare, it must be considered in the differential diagnosis of the etiology of retrobulbar and optic neuritis.

Tumors of the basal portion of the frontal lobe

Tumors involving the basal portion of the frontal lobe may also produce a syndrome similar to that of retrobulbar or optic neuritis[4]. Usually the history of slowly progressive loss of vision, associated with adjacent cerebral manifestations, is sufficient to distinguish between pressure and inflammation. But the early phase of the syndrome may produce misleading data. The following case presented these difficulties.

Case 6. Unilateral retrobulbar neuritis in right eye for two years. A man, aged twenty-nine years, came to the clinic in 1922 complaining of pressure in the head and occasional headaches for eight years; the headaches had become accentuated in the last three months. He thought they were worse at the end of the day, and that they would disappear with complete rest or absence of business worries. The general examination, which included ophthalmologic examination, was negative. Vision was 6/4 in each eye and the fundus of each eye was normal. A diagnosis of nervous fatigue was made.

The patient returned in October, 1927, because of blurred vision in the right eye since January, for which a sinus operation had been performed elsewhere in February. Vision did not improve. He had noticed no other change since his visit in 1922. Ophthalmologic examination now revealed vision of 6/10 in the right eye and 6/5 in the left. The fundus of each eye was normal. Perimetric fields revealed a small absolute central scotoma in the right eye. General and neurologic examinations and roentgenograms of the head were negative. A diagnosis of retrobulbar neuritis was made and the patient was advised to return in two months. This he did not do, as he spent most of his time in the East and South.

The patient was examined in Philadelphia

two years later by Dr. de Schweinitz and Dr. Frazier because of rapid loss of vision in the right eye to complete amaurosis, and a beginning defect of the upper temporal quadrant of the left eye, associated with bilateral choked discs. He was operated on and a large endothelioma in the right basal frontal fossa was removed. He died, and necropsy substantiated the diagnosis of endothelioma of the right olfactory groove.

This case is unusual as the small absolute central scotoma in the right eye was present two years before the patient had a real intracranial syndrome, and he had been subjected to the usual sinus operation so common in these cases. Because of the slowly progressive loss of vision, nicotine and chronic alcohol poisoning may simulate a syndrome of tumor. Nasopharyngeal neoplasms also produce a similar clinical picture[2].

Toxic amblyopia

Retrobulbar neuritis due to nicotine poison is characterized by a slowly progressive diminution of the central vision, usually bilateral, although it can be unilateral. The disturbance is so gradual that the patients are unable to tell exactly when it begins. They first notice difficulty in reading small print, which is unimproved with glasses. The symptom of nyctalopia is common; the patient sees better in the dawn or evening, while in the day a troublesome cloud dazzles his sight. Diminution of illumination sometimes improves the vision. Ophthalmoscopic examination reveals little, although in extremely chronic cases pallor of the discs may be present. The central vision is reduced, and the perimetric fields reveal some central scotomatous defect, usually a relative or absolute central scotoma. Certain observers have described a characteristic elongated[9], narrow central scotoma continuous with the physiologic blind spot. In my experience, the size and shape of the different scotomatous defects depend on the stage the condition has reached, and none is pathognomonic of any specific etiologic factor.

The cause of nicotine amblyopia is the excessive use of tobacco, either smoking or chewing. The disease is not common but is usually seen in the fifth or sixth decade of life of patients who smoke cigars or pipes excessively. Resistance to nicotine may diminish with age, but the patient usually affected is one who has more or less retired from active physical life, and during the increased periods of leisure, smokes or chews excessively. I have never seen a case of nicotine poisoning due to cigarette smoking.

Treatment as a routine consists of abstaining from cigars, pipes or chewing tobacco; usually one course of pilocarpine sweats improves the vision to normal limits. During this period the patient is allowed to choose and use his own brand of cigarettes. The amount of tobacco necessary to produce disturbance of vision is so variable that no rule can be established. Usually nicotine poisoning is associated with that of alcohol, although either may produce the amblyopia separately. Also, metabolic and nutritional disturbances are factors, as seen in the relative frequency of nicotine poisoning in cases of diabetes, anemia, and brain tumor. These common clinical combinations tend to substantiate my previous statement, that a definite diagnosis as to etiology should never be attempted until a complete general and neurologic examination, including spinal puncture, has been completed.

Just how the fibers of the optic nerve are affected is a moot question[1]. Some observers believe that the papillomacular bundle of nerves only is affected; others believe the ganglion cells of the retina are first involved. The former opinion seems to me to be better substantiated clinically. The following cases are presented as they typify nicotine poisoning alone, or associated with chronic alcoholism, diabetes mellitus, and pernicious anemia. Retrobulbar neuritis can be caused by any of these conditions without the association of nicotine, but as such, they are much rarer clinically. When any such condition is found to be present, proper general therapeutic measures usually improve the vision, and pilocarpine sweats may not be necessary.

Case 7. Retrobulbar neuritis due to nicotine poisoning alone. A man, aged sixty-three

years, came to the clinic in 1927, because of failing vision in both eyes with inability to read average print for the last three weeks. He had smoked cigars excessively since the age of twenty-seven years. For the last nine months he had noticed inability to follow the flight of his golf ball and relied on his friends to tell him where it fell.

Ophthalmologic examination revealed vision of 6/20 in the right eye and 6/15 in the left. The fundus of both eyes was normal. Perimetric examination revealed bilateral central scotomas for form and colors. General and neurologic examinations were negative.

The patient was given a series of pilocarpine sweats which resulted in rapid improvement of vision to 6/7 in each eye and normal fields. He was able to read the smallest print. He has now substituted cigarettes for cigars, smoking about thirty a day.

In a letter in 1928 he wrote: "I play golf once in awhile. I did not have to say to the boys 'watch it' for I could see for myself. It does not seem possible that I have improved so; it is wonderful. It seems so good to be able to read the finest print with perfect ease."

This case demonstrates the good results obtained before any permanent injury to the optic nerves has taken place. Too often, patients do not present themselves until a definite pallor of both discs is present, when it is usually too late to obtain a return to normal vision, although some improvement is possible.

Case 8. Retrobulbar neuritis due to nicotine poisoning, associated with diabetes mellitus. A man, aged sixty years, came to the clinic in 1924, because of a left inguinal hernia. General examination revealed definite diabetes mellitus, the sugar in the urine was 1.28 percent, or 9.17 gm., and that of the blood was 14.6 percent. Examination of the eyes was negative.

The patient was operated on for the inguinal hernia and treated for diabetes. He returned to the clinic in 1927, complaining of failing vision in each eye for six months. He had recently been examined at home and the right maxillary sinus had been operated on without improvement in vision. An interesting history with regard to nicotine was now elicited. He did not smoke from 1897 to 1920. From 1920 until August, 1926, he smoked cigarettes. While on vacation during August he began to smoke six to eight "stogies" a day, and abstained from cigarettes. One month later central vision began to fail.

Examination revealed vision of the right eye to be 2/60 and of the left eye ability to count fingers. The fundus of both eyes was normal. The perimetric fields revealed large cecocentral scotomas in each eye. The blood sugar was 0.14 percent. The patient was given a series of pilocarpine sweats with a gradual return of central vision. He was advised to discontinue the use of the "stogies" and return to the use of cigarettes. He was examined in December, 1929; vision was 6/7 in each eye and a central scotoma could not be elicited in either eye.

Although the diabetes mellitus has remained unchanged in this case, the definite history of the smoking habit is sufficient, I believe, to attribute the cause to nicotine, rather than to diabetes. Diabetes alone can produce the ophthalmologic picture of retrobulbar neuritis, with return of normal vision when the diabetes is controlled. This syndrome must not be confused with the temporary change in vision due to increased hyperopia in diabetes mellitus.

Case 9. Retrobulbar neuritis due to nicotine and ethyl alcohol poisoning. A man, aged forty-six years, came to the clinic in 1921 for refraction. He gave a history of always having had poor vision in the right eye. Refraction revealed vision in the right eye to be 6/60 with correction, and 6/12 in the left eye. The extraocular muscles showed mild convergent strabismus with bilateral insufficiency of the external recti muscles. Examination of the fundus was negative. Examination of the retina revealed high hyperopic astigmatism in each eye.

The patient returned to the clinic in 1927, complaining of gradual loss of central vision and inability to read with his left eye, his only good eye. Perimetric fields revealed an absolute central scotoma in each. He smoked twenty cigars a day and used considerable alcohol. He was given a series of pilocarpine sweats, with abstinence from alcohol and cigars. The vision improved rapidly, and after eight sweats, vision in the left eye was 6/7 and he could read the smallest print. The general and neurologic examinations were entirely negative except for two infected teeth. At the time of dismissal he was advised to cease using alcohol, and substitute cigarettes for cigars. He has remained well since.

This case demonstrates a common clinical variety. Ethyl alcohol, alone, can and does produce the same syndrome. The treatment is the same in each case. In some cases of alcohol poisoning, a precipitate and complete loss of vision occurs. This is usually due to either methyl alcohol or some impurity in ethyl elcohol. Sometimes loss of vision is permanent, but as a rule patients recover useful sight. A

patient presenting such an idiosyncrasy for alcohol should practice complete abstinence.

I previously reported a case of unilateral nicotine amblyopia[6], associated with a tumor of the pituitary gland. Following abstinence of cigar smoking, vision returned and remained normal for more than a year before typical field changes produced by the pituitary tumor developed.

The association of nicotine poisoning with pernicious anemia, and also with chronic lymphatic leukemia has been observed. The clinical features are similar to those of diabetes, tumors, and alcohol. Therefore, specific case histories are not presented. Also the occurrence of retrobulbar neuritis with pernicious anemia without nicotine poisoning has been observed. In all such conditions the prognosis is dependent on the response obtained from the general therapeutic measures. The precipitate changes in vision associated with pituitary tumors are sometimes due to chronic alcoholism[5].

Lactation optic neuritis

Although cases of this type are rare, a definite clinical entity has been established. Just why increased lactation should produce optic neuritis is a moot question, especially if the patient is a multipara, who has previously breast fed two children without any toxic incident. It is necessary to recognize this syndrome, as breast feeding should be stopped, or serious injury to vision will result.

Case 10. Toxic amblyopia due to lactation optic neuritis. A woman, aged thirty-three years, first came to the clinic in 1925 because of complete blindness in each eye of one week's duration. Three months previously she had given birth to her third child. The baby had been breast fed. Ten days ago she awakened complaining of a mild headache. This disappeared during the day, but the next morning everything appeared hazy, and in twenty-four hours she was completely blind.

The ophthalmologic examination revealed dilated and stiff pupils, with marked acute optic neuritis, and swelling of the disc of 2 to 3 diopters. The general and neurologic examinations were negative except for infected teeth. A diagnosis of optic neuritis due to lactation was made and the patient was given a series of pilocarpine sweats. Vision improved daily and at the completion of eight sweats, it was 6/10 in the right eye and 6/60 in the left. Edema of the discs subsided with resulting pallor and narrowing of the retinal arteries. The infected teeth were then removed, and the last ophthalmologic examination revealed vision of 6/7 in the right eye and 6/30 in the left. The perimetric fields were normal for the right eye, but a relative central scotoma persisted in the left eye.

Lead poisoning

Case 11. Retrobulbar neuritis due to lead poisoning. A man, aged twenty-three years, came to the clinic in 1930 because of failing vision in both eyes for three months. In April, 1929, he began washing automobile brakes with ethyl gasoline. During this procedure he noticed white deposits from the gasoline on his hands, and the skin felt dry. He gradually lost his appetite. About December, 1929, he began to have epigastric and abdominal cramps, and vomited in the morning on awakening. At this time a blue line was noticed on his gums and his teeth became loose. This was diagnosed pyorrhea by his employer. The latter part of December he swallowed a mouthful of ethyl gasoline while sucking it out of an automobile tank. He noticed immediately burning of the mouth, esophagus and stomach. He induced vomiting, and was taken to a hospital where his stomach was pumped. After twenty-four hours, severe abdominal cramps, occipital headaches and difficulty with breathing developed. Associated with these symptoms was severe dysuria. Examination of the urine revealed the presence of lead.

The patient was discharged from the hospital and felt well for two weeks when abdominal cramps again appeared and he suddenly lost vision in both eyes. He was hospitalized and the cramps disappeared, the vision improved, but enough impairment persisted to incapacitate him. During this period his hair became so light in color that he used dye. The headaches and some gastric distress have persisted, along with the visual disability.

General examination was negative except for straw-yellow hair, and a mild lead line of the gums. When the urine was first examined, lead was not found, but repeated daily examinations revealed a variation from 0.04 to 0.16 mg. Ophthalmologic examination revealed ability to count fingers with each eye. Examination of the fundus was negative, except for mild granular changes in each macula. The perimetric fields were normal to form, but a definite absolute central scotoma was found in each. The neurologic examination, including a spinal puncture, was essentially negative.

Calcium lactate and parathormone were given and the lead was gradually precipitated; vision gradually improved to 6/10 in each eye, with ability to read J. 0.50 readily. The central scotomas disappeared; the fields returned to normal for both form and colors.

This case apparently represents an acute exacerbation, precipitated by the swallowing of ethyl gasoline, of chronic lead poisoning. Most cases of lead poisoning are of the chronic type, and it is sometimes difficult to elicit a history or have the suggested diagnosis verified by finding lead in the urine. It may be necessary to precipitate the lead slowly by therapeutic measures, before the urine will show a trace of the metal.

Thallium poisoning

Similar untoward ocular effects to those seen from lead poisoning, are produced by thallium. In a recent communication[7] two cases were reported, which were the result of using a proprietary preparation, Koremlu cream, as a facial depilatory. These cases are sometimes confused also with the ophthalmic syndrome of multiple sclerosis, inasmuch as the visual symptoms fluctuate with the intermittent use of the depilatory cream.

Paranasal sinusitis

Only one case, due to sinusitis, of retrobulbar or optic neuritis has been observed at The Mayo Clinic. As a routine all cases of sinusitis are examined ophthalmologically, usually with negative results. One case, previously reported[5], revealed purulent sphenoiditis associated with a pituitary tumor. In more than 60 percent of the cases of retrobulbar or optic neuritis in more than 500 cases observed, a paranasal sinus operation had been done elsewhere sometime during the course of the illness. The same percentage is true of definitely proved tumors of the brain. This, it seems, would signify that the medical profession as a whole, is not conversant with the etiologic possibilities. It is true that in a certain percentage of these cases sinusitis may have been associated, but the basic etiologic factor was not caused by the sinusitis. This is proved clinically by the ultimate course of the disease, whether due to multiple sclerosis, meningo-encephalitis, nicotine poisoning, tumor of the brain, or lead poisoning. Perhaps the retrobulbar or optic neuritis which may be produced by sinusitis is temporary, or readily responds to treatment, properly instigated, so that further investigation is not necessary. I believe that the significance of sinusitis, as a common cause of retrobulbar or optic neuritis, has been stressed too strongly to the medical profession. Positive data as revealed by roentgenograms of the paranasal sinuses may be misleading, especially when not substantiated by clinical examinations, as a cloudy sinus may be the residuum of an ancient infection, and not of present clinical significance. My experience in considering sinusitis as an etiologic factor in retrobulbar or optic neuritis has been negative rather than positive.

Miscellaneous cases

A small percentage of cases has been observed in which the retrobulbar neuritis was probably congenital. These are usually associated with strabismus, or may be the chief cause of the strabismus. Leber's hereditary optic atrophy although rare, must also be considered; usually the history of the case will suffice to diagnose the condition. I have observed a few cases due to syphilis, although a central scotoma is supposedly rare in this disease. The possibility of the central scotoma in a case of syphilis being due to the therapeutic measures employed must be considered, although such an occurrence is also rare, even when tryparsamide is used[3].

A small percentage of cases still is unclassified, as nothing is revealed by complete general and neurologic examination. Such cases are treated by the usual methods, but the prognosis as to end results must be guarded.

Central field changes

The central field may present any type of change from a small relative central scotoma to complete amaurosis. The usual course in the slowly progressive type of retrobulbar neuritis is the progression of the small relative central scotoma, to a small absolute central scotoma, cecocentral scotoma, temporal islands of vision, and complete amaurosis. The reverse of this may be true, especially in acute cases. The type

of defect found will depend on the severity and chronicity of the condition. No specific scotoma has been elicited which from its character alone could signify the etiologic factor. These scotomas are as readily mapped out on the perimeter, as on a campimeter or screen. Elaborate special equipment is not necessary to elicit the defects. Patients with relatively high refractive errors or presbyopia should only be tested with their glasses on, as scotomas due to these factors must be eliminated, to insure a correct diagnosis. Observing the manner in which a person tries to read small print often suggests central visual defect, for they will tilt the card with a rolling motion in order to see around their defect. The earliest changes are found in the inability to tell small colored objects accurately.

Summary

After the clinical syndrome of retrobulbar or optic neuritis has been established, the most important aid in suggesting the etiologic factor is carefully taken history, keeping in mind the common and uncommon causes. Even to the extent of repetition or embarrassment in eliciting habits, good or bad, every endeavor should be made to discover a cause. When this is known, the treatment can be better directed, and the end result better prognosticated. Definite conclusions as to etiology, even though apparently self-evident, should not be made until a comprehensive general and neurologic examination, including examination of the spinal fluid, is finished, since far too often, more than one cause may exist, to the embarrassment of the diagnostician later.

When one stops to consider that multiple sclerosis, meningo-encephalitis, tumors of the basofrontal lobe, chiasmal lesions complicated by extraneous factors, metabolic disturbances such as diabetes, pernicious anemia, myelogenous leukemia, nicotine, alcohol, combinations of nicotine and alcohol, nicotine or alcohol and diabetes or pernicious anemia, thallium poisoning, wood alcohol, lead, lactation, hereditary or congenital factors, sinusitis, various heavy metals and chemicals, may be factors in producing this clinical syndrome, thoroughness rather than hasty conclusions as to the etiology is warranted.

This summary of etiologic factors in retrobulbar or optic neuritis seems to show that the problem is not solely that of the ophthalmologist. The internist, pediatrician, obstetrician, neurologist, neurosurgeon, chemist, oto-rhino-laryngologist and dermatologist are also affected, and the concerted effort of all is necessary satisfactorily to diagnose and treat the condition. Even then many necessary factors are wanting, and the clinical problem of retrobulbar and optic neuritis is still not entirely solved.

The Mayo Clinic.

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FUNDAMENTAL PRINCIPLES OF CYLINDER RETINOSCOPY

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The underlying principles are illustrated by the practical application of the method of retinoscopy by cylinders to hypothetical cases. From a lecture before the House Officers, Graduate Students in Ophthalmology, of the Massachusetts Eye and Ear Infirmary, Boston, May 25, 1933.

Cylinder retinoscopy as the name implies is retinoscopy in which cylinders are used for neutralizing as well as for checking purposes. Of course this does not mean that only cylinders are used throughout the test. Generally spheres are used first and the method may perhaps best be termed sphero-cylinder retinoscopy as distinguished from ordinary, "sphere" retinoscopy where only spherical lenses are used for neutralization. In the latter method each principal meridian is neutralized with a sphere and during neutralization but little attention is paid to the other meridians. In cylinder retinoscopy, on the other hand, attention must be paid to more than one meridian at a time. The advantage of cylinder retinoscopy is that it offers a delicate check test for determining the accuracy of the cylinder axis and the accuracy of the cylinder power.

The practical basis of retinoscopy is the observation of reflex movements. By the term reflex I include the pupillary light-and-shadow. Reflex movements are of two types. One type, the with, neutral, and against movements, gives information with reference to emmetropia along the meridian examined. A neutral movement indicates that the refraction is emmetropic, a "with" movement that it is hyperopic, and an "against" movement that it is myopic; all of course, relative to the position of the examiner.

The other type of reflex movements, appropriately called corresponding and oblique movements, gives information of a different nature. These movements show whether the error in the eye is spherical or cylindrical. By corresponding movements (where there is no cylinder before the eye) are meant reflex movements running along the direction in which the mirror movements are made. If for example the mirror is rotated in the vertical meridian (on a horizontal axis) and the reflex moves in the same meridian, with or against as the case may be, the movement is a corresponding movement. If the mirror is rotated, say, in the 45° meridian and the reflex movements follow in the same meridian, with or against, this also is a corresponding movement. In all cases corresponding movements follow the mirror movements, "with" or "against," in whatever meridian the mirror movements are made.

By oblique movements are meant, in general, reflex movements which are oblique to the direction of the mirror rotation, as for example when mirror rotations are made in the vertical meridian and the reflex moves to the side of it, as along the 70° meridian. But if the mirror movements are made along the 70° meridian and the reflex movements run along the same meridian the movements are corresponding.

However, if there is a cylinder before the examined eye then oblique movements are those which run obliquely to the principal meridians of the cylinder, irrespective of their relation to the mirror movements. For example, if a cylinder is place at axis 90° so that its principal meridians are 90° and 180°, all reflex movements not along these meridians are oblique movements. To make these movements most prominent, mirror rotations must be made obliquely to 90° and 180°; in fact, along directions corresponding to the obliquity of the reflex movements. If these move, for example along the 20° and 110° meridians, mirror movements along the 20° and 110° meridians will bring the reflex movements out most distinctly. Thus the mirror and reflex movements may be made to correspond. But since the reflex movements are ob-

lique to the principal meridians of the inserted cylinder, they are regarded as oblique movements. They are necessarily oblique to the mirror rotations when the latter are made along the principal cylinder meridians.

Briefly then, where no cylinder is before the examined eye, corresponding and oblique reflex movements are defined with reference to their coincidence with, or deviation from, the direction of mirror rotations. Where a cylinder is placed before the examined eye, corresponding and oblique movements are defined with reference to their coincidence with, or deviation from, the direction of the principal meridians of the inserted cylinder, and this irrespective of their relation to the direction of mirror rotations. As a word of caution we must guard against identifying oblique movements with oblique astigmatism.

This type of movement then, the corresponding or oblique, gives information as to whether the refractive error is spherical or cylindrical. In a spherical error all movements are corresponding movements. If, for example, making mirror rotations in four cardinal directions along the 180°, 90°, 45°, and 135° meridians, corresponding movements in all of them are found we know that the error is a spherical error. Where a cylindrical error is present all movements are oblique except two, those along the principal meridians. If, for example, in making mirror rotations along four cardinal directions we observe in any one of them oblique movements we know that there is a cylindrical error present.

Detecting obliquity of movements is often rather difficult especially in compound astigmatic errors, but it is the observation of oblique movements that is one of the cardinal points in cylinder retinoscopy. However, when a compound cylindrical error is reduced to a simple cylindrical error, the difficulty of observation becomes much less and this is the procedure we follow. That is, we change every compound astigmatic error first into a simple astigmatic error before applying cylinders.

Presuppose a case in which there is a "with" movement in all meridians. It may be impossible to tell if the movements are all corresponding or not but it is not necessary to search for that at this point. We apply plus spheres and continue to watch along two or three meridians, for example the vertical, the horizontal, and the 45° meridian. As we proceed with increasing plus spheres we shall soon be able to notice if the movement along some one meridian tends to lessen and to become neutral. This of course indicates the presence of a cylindrical error. At the same time it will generally be possible now to detect obliquity of movement; another indication of a cylindrical error. We now proceed with plus spheres until one meridian is neutralized with a sphere. It is important that this neutralization be made as perfectly as possible because the more accurate this is, the easier and more accurate will be the subsequent work with the cylinders.

Suppose that with a +2.00 D.sph. the horizontal or near-horizontal meridian is perfectly neutralized, while there is still a "with" motion along the vertical or near-vertical meridian. The axis of the plus cylinder is accordingly at, or near 180°. We place, for example, a +1.00 D.cyl. at axis 180° and make mirror rotations along the principal cylinder meridians, 90° and 180°. At this point appears the first important observation.

If there are corresponding movements in both meridians, then 180° is the correct axis. The movements must be neutral in the horizontal meridian and may be "with," neutral or "against" in the vertical meridian, depending upon whether the plus 1.00 cylinder is too weak, just right, or too strong. All that is now required is to change the cylinder power, if necessary, keeping the same axis throughout until neutralization in the vertical meridian is accomplished.

If, however, as we rotate the mirror along the principal meridians of the inserted plus 1.00 cylinder, we observe the presence of oblique movements, we know that axis 180° is incorrect. The movements which are oblique to the principal cylinder meridians can be brought out more readily by making

the mirror movements oblique to the principal cylinder meridians. The presence of oblique movements as previously defined indicates a wrong axis. This is one sign. There is, however, another important sign which shows that the cylinder axis is wrong, namely, that the oblique movements observed are opposite in kind; there is one "with" movement and at right angles to it an "against" movement. They may be equal or unequal in extent and rapidity, depending upon several factors which will not be discussed at this point, but the essential feature is that they are opposite in kind. These are then two important signs of an incorrect axis position, namely, oblique and opposite movements.

To locate the correct axis the plus cylinder has to be turned towards the "myopic" meridian. To reiterate, because of the incorrect axis position there were obtained oblique, opposite movements, one "with" and one "against." The meridian in which there is a "with" movement is the relatively "hyperopic" meridian while the meridian in which there is the "against" movement is the relatively "myopic" meridian. The plus cylinder axis must be turned towards that meridian in which there is "against" movement, which may be named the "against-meridian." The direction of this "against-meridian" is, however, frequently more easily determined by noting the direction of the so-called light-band, in this case the "with-band."

Forgetting cylinder retinoscopy for a moment and just considering retinoscopic movements in general, suppose we have neutralized the horizontal meridian of an eye and find "with" movements in the vertical meridian. The vertical meridian may be called the "with-meridian" but the reflex that moves "with" the mirror in the vertical meridian is itself more or less a band running horizontally. It is a horizontal light-band that moves "with" in the vertical meridian. This band may be called the "with-band." It is at right angles to the "with-meridian." Similarly there may be an "against-band" running at right angles to the direction of the "against-meridian." For instance, the horizontal meridian may be relatively myopic and will therefore show an "against" movement of a band running vertically. Here also the "against-band" and the "against-meridian" are at right angles to each other. But what follows from this analysis and is most important is that the "against-meridian" and the "with-band" run along the same direction, the direction of the relatively myopic meridian; and similarly the "with-meridian" and the "against-band" also run along the same direction, namely the relatively hyperopic meridian. The band nature of the reflex may be only faintly recognizable, but it is a convenient land mark to keep in mind.

Returning to the illustration, a plus 1.00 cylinder placed at axis 180° gave oblique opposite movements. The cylinder axis has to be turned towards the myopic meridian, the "against-meridian," that is, towards the meridian in which there is "against" movement, or towards the direction of the "with-band." The direction of this band is usually the more easily recognized. Suppose the "with-band" points to about 60°, the plus 1.00 cylinder is rotated from 180° to 10° for illustration. Mirror rotations are again made along the principal cylinder meridians or other meridians and the presence or absence of oblique, opposite movements again noted. If the movements are now corresponding movements, especially if there are no opposite movements, axis 10° is correct. But if in the new position there still appear oblique and opposite movements the direction of the "with-band" or the "against-meridian" must again be noted and the cylinder turned, possibly, 5 or 10 degrees towards it. This is done until a position is found which gives only corresponding movements, the movement being most marked when mirror rotations are made along the principal cylinder meridians.

In the case of minus cylinders exactly the same procedure is followed, except that the cylinder has to be turned to the relatively hyperopic meridian. If we neutralized the horizontal or near horizontal meridian with a sphere and the

vertical meridian shows against movements, a minus 1.00 cylinder is to be placed at axis 180° and watch kept for the presence or absence of oblique, opposite movements. If such movements are observed, we note the direction of the "against-band" or the "with-meridian" and turn the cylinder 5 or 10 degrees towards that direction. This is the only difference in method when minus cylinders are used. The cylinder has to be turned towards the "with-meridian" or "against-band." The cylinder is rotated further if necessary, until the reflex movements run along the principal cylinder meridians, most marked when the mirror movements are also made along the principal cylinder meridians.

As a negative sign we watch the absence of opposite movements. This in essence is the method of procedure for accurately locating the cylinder axis by cylinder retinoscopy.

The second application of cylinder retinoscopy is to check the accuracy of the cylindric power after the correct axis has been found. The method, called the Cylinder Rotation Test, can likewise best be explained by an illustration. Suppose there appeared to be a +2.00 cylinder axis 70° and we want to check the accuracy of the cylinder power. Displace the cylinder 10 degrees, placing it at axis 60°. We now put a guide mark, such as the handle of the spherical lens, 50 degrees away from this position, that is at meridian 110°. This meridian becomes our guide meridian. The angle between this meridian and the new (false) axis position is called the guide angle. We now make mirror rotations and find, as expected, oblique, opposite movements.

As we are working with a plus cylinder we watch for the direction of the "against-movement" or the "with-band." If this runs along the direction of the guide meridian, that is, along 110°, the cylinder power is just right. If the "against-meridian" or the "with-band" is closer to the cylinder axis than the guide meridian, for instance about 90°, then the +2.00 cylinder is too weak. If the "against-meridian" or the "with-band" runs somewhere along the other side of the guide meridian, that is, further from the axis, at about 130°, the +2.00 cylinder is too strong. The cylinder is accordingly changed in power until the "with-band" or the "against-meridian" coincides with the guide meridian at 110°.

A similar procedure is followed when using minus cylinders. Suppose there were found a —2.00 cylinder axis 180° in which the axis position had been checked and we wanted now to check the correctness of the power. We displace the —2.00 cylinder about 10°, placing it at axis 170° and locate the guide mark 50 degrees from it, that is, at meridian 40°. The guide meridian then runs along 40°. We now make mirror rotations and find as anticipated, oblique, opposite movements. We look for the direction of the "against-band" or the "with-meridian" and see if this corresponds to the guide meridian. If so, the —2.00 cylinder is exactly right. If the "against-band" points within the guide meridian, that is, closer to the cylinder axis, about 25° or 30°, the cylinder is too weak. If the "against" band points somewhere on the other side of the guide meridian, that is, on the side farther from the axis, such as at 60°, the cylinder is too strong. Corresponding changes in cylinder power are then made until the "against-band" or "with-meridian" runs along the guide meridian, in this case the 40° meridian. The procedure may be repeated with a displacement of the cylinder axis by 20 degrees. In that case the guide meridian will be at an angular distance of 55 degrees from the false axis position, always measured in the direction of the true axis position. The angle between the new (false) axis position and the guide meridian is the so-called guide-angle and is always equal to 45° plus one half the angle of cylindric displacement.

This, in essence, is the method of checking the accuracy of the cylinder power by cylinder retinoscopy.

I may add that in practicing cylinder retinoscopy a keen eye is required for observation and a good deal of practice. A good instrument and a dark room are also essential. The method is best used with a dilated pupil though sometimes

the peripheral aberrations are a source of disturbance. Fixation by the patient must be definite and direct and the examiner's observation line must also be definite and not change appreciably during the examination. It is, therefore, generally made most easily and accurately under cycloplegia. Placing the handle of the cylinder lens in line with the axis as suggested by Prof. Lindner is also of assistance.

The theoretical basis of these applications of cylinder retinoscopy is to be found in a study of the effect of obliquely crossed cylinders. The first exposition of this work was made almost forty years ago by Dr. Edward Jackson and since then the work has been extended by foreign investigators, amongst them Lindner and Kraemer (Vienna), Marquez (Madrid) and others. As a convenience in following these explanations one may think of an eye with 1.00 diopter of hyperopic astigmatism as an emmetropic eye in which a minus 1.00 D. cylinder has been inserted. The astigmatic error in the eye may be regarded as one cylinder and the correcting plus cylinder the other. Or an eye with 1.00 diopter of myopic astigmatism may be regarded as an emmetropic eye in which a plus 1.00 D. cylinder has been inserted. The correction is a —1.00 D. cylinder. The "eye" cylinder and the correcting cylinder are necessarily opposite in kind. The effect of a correcting cylinder off axis is to create with the "eye" cylinder a new combination of a plus and minus cylinder at right angles to each other and placed somewhere between the original cylinders.

500 West End Ave.

TONOMETRY IN PERNICIOUS ANEMIA

A study of twenty-five cases

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Although in this study of intraocular pressure as observed in cases of pernicious anemia, some individuals showed a nearly normal pressure when the blood constituents were far below normal, yet in most cases of primary anemia the tension was noticeably reduced and returned to normal limits only when the blood condition was improved.
Read before the Chicago Ophthalmological Society, April 17, 1933.

The case which led to the study of intraocular tension in the pernicious anemias was a typical case of agranulocytosis on which Dr. Stapler of Chicago called me in consultation. The patient had a palpebral conjunctival ulcer of the left eye, which was refractory to any treatment, and healed only when the blood picture began to assume normal proportions.

The history of this case in brief is as follows:

Mrs. M., aged 45 years, entered the hospital on June 30, 1932. The left eyeball was more or less injected, painful, and photophobic, the pupil larger than that in the right eye. This led to our taking the intraocular tension, which was found to be 8 mm. Hg in each eye.

All the blood examinations were made by Prof. Jaffe (Grant Hospital). Dr. Stapler made numerous blood transfusions—fortunately the patient's husband was a robust and vigorous man, whose blood type was the same as his wife's.

Chart 1 gives in brief, the blood picture and intraocular tension from July 1, 1932, to March 4, 1933. She has had transfusions at regular intervals (7-12 c.c. of whole blood) and the intraocular tension has remained normal.

Whether or not decreased intraocular tension is a regular clinical finding in every case of agranulocytosis we do not know, as only one other instance of this

* ED. Dr. Suker died on July 2, 1933.

Chart 1

Date	H.B.	R.B.C.	60–70% Poly.	Leuco.	25% Lymp.	5–8% Mono.	Tension		B.P.
							R.	L.	
7–1–32	75 80	4,400,000	4	2200	79	17	8	9	116/80
7–2	65 70	3,900,000	4	1600	87	9	8	8	
7–3	60	3,600,000	10	2500	87	2	6	8	
7–4	70	4,560,000	9	1150	88	3	8	7	
7–5	70	4,000,000	12	1800	79	9	8	7	
7–6	70	4,080,000	10	1800	90	10	10	12	
7–21			2	3800	87	9	13	13	
7–23			13	4900	75	10	16	15	110/90
7–27			38	5200	56	6	13	14	112/60
7–29			39	5000	56	5	14	14	118/78
8–2			30	5100	59	10	14	14	124/78
8–8	75	4,420,000	30	4900	58	9	14	14	110/72
8–10	78	4,500,000	40	5600	40	8	16	16	130/84
11–10	80	4,170,000	47	5500	47	5	24	24	130/80
12–10	80	4,160,000	27	5400	70	3	20	19	
1–7–33	80	4,100,000	54	7400	42	4	22	22	
1–14	80	4,240,000	38	5600	59	5	18	18	
2–25	70	3,400,000	40	6540	57	3	25	24	135/85
2–28	—	—	—	—	—	—	24	25	
3–4	—	—	—	—	—	—	24	24	140/90
		7–12 c.c. Whole Blood from time to time now							

disease came under observation while intraocular tensions were being taken in the cases of pernicious anemia. In it the tension was 11 in each eye, and the agranulocytosis was due to neoarsphenamine.

In all there were 31 cases, classified as follows:

Agranulocytic anemia	1
Pernicious anemia	27
Aplastic anemia	1
Lymphatic leucemia	1
Agranulocytic angina, following intensive antiluetic treatment with neoarsphenamine	1

The case of agranulocytic anemia was the cause of this study. Of the thirty-one cases investigated, two ended in death before a second tension could be taken. The cases of aplastic and lymphatic leucemia and of agranulocytic angina tend to prove that the intraocular tension is also markedly reduced in these types of anemia. These six cases are not a part of this discussion; hence, there were twenty-five cases of pernicious anemia for consideration. All were passed upon by Dr. Richard Jaffe, the pathologist.

The general ocular findings were as follows:

1. Rather uniform absence of retinal hemorrhages.
2. The disc vessels were much lighter in color than the retinal vessels when hemoglobin fell to 50 or below.
3. On an average the fundus hue was of a lighter shade than normal.
4. The light streaks along the retinal vessels did not vary sufficiently from the normal to be of any symtomologic value, even in the presence of an atheroma or sclerosis of the vessels.
5. The course of the retinal vessels was little if any altered.
6. The visual field, by confrontation test, was within normal limits. (All patients were bedridden.)
7. No symptoms were indicative of retinal torpor or scintillating scotoma.

The 25 cases of pernicious anemia in which the tension was taken are as shown in Charts 2-5.

Several were so far advanced that exitus occurred within a few days after entry into hospital. Though the cases were on various medical services, the treatment administered was rather uniformly the same.

The tensions were taken at about the same hour of the day, usually in the afternoon, by Dr. Bellows, the ophthal-

Charts 2-5

Case	Date	Sex, Age	HB 90	R.B.C.	Index	W.B.C.	Tension R.	Tension L.	B.P.
1	8–15–32	M46	53	2,350,000	1.1	9,100	11	11	120/80
	8–31		64	3,480,000	.9	13,900	16	16	
	9–13		71	3,590,000	1.1	16,400	18.5	18.5	
2	8–17–32	M60	46	1,660,000	1.4	2,900	12	11	130/78
	9–1		52	1,830,000	1.4	6,900	16	18.5	
3	9–7–32	F 50	66	2,720,000	1.2	5,600	11	11	110/85
	9–13		80	3,150,000	1.3	4,900	16	16	
4	8–6–32	F 50	28	1,060,000	1.3	3,500	13	13	98/52
	8–16		39	1,410,000	1.4	5,100	17	17	
	9–2		49	1,740,000	1.4	4,700	9	9	
5	11–13–32	F 56	57	2,560,000	1.1	12,300	11	11	130/80
	11–18		64	2,850,000	1.2	12,600	13	14	
6	9–2–32	M71	67	2,810,000	1.1	5,200	11.5	11	116/62
	9–18		82	3,540,000	1.2	11,900	13	12.5	

Charts 2-5 (Continued)

Case	Date	Sex, Age	HB 90	R.B.C.	Index	W.B.C.	Tension R	Tension L	B.P.
7	8–6–32	M53	38	1,320,000	1.4	2,800	17	17	104/70
	8–29		49	2,190,000	1.1	3,700	9	9.5	
8	11–9–32	M53	15	530,000	1.5	2,900	11	13	118/64
	12–6		29	1,140,000	1.3	8,300	17	15	
	12–20		71	3,130,000	1.1	12,900	11	11	
9	12–1–32	M47	16	640,000	1.3	10,200	17	13	110/60
	12–6		27	1,070,000	1.3	2,100	18	17	
	12–17		60	3,020,000	1.0	6,600	17	17	
	12–23		57	2,900,000	1.0	7,100	11	17	
10	7–26–32	M	77	3,490,000	1.1	6,100	17	20	120/70
	8–2		75	3,090,000	1.0	6,500	12	15	
11	7–20–32	F 55	60	2,400,000	1.0	5,600	13	13	130/80
	8–16		71	3,300,000	1.0	6,800	24	26	
12	7–21–32	F 35	25	920,000	1.0	4,900	20	18	112/55
	8–6		53	2,650,000	1.0	6,100	24	28	
13	7–26–32	M	72	3,110,000	1.1	4,800	18	18	120/54
	8–6		65	3,510,000	.9	6,900	13	12	
14	8–2–32	M	20	880,000	1.2	2,000	13	13	86/44
	9–3		50	2,400,000	1.	8,200	17	17	
15	11–13–32	M65	45	1,790,000	1.1	6,200	13	15	120/60
	12–3		55	2,480,000	1.1	11,600	20	22	
16	12–2–32	F 60	23	1,030,000	1.1	2,700	13	14	135/70
	12–8		26	1,040,000	1.3	3,900	11	20	
	12–17		27	1,220,000	1.1	7,500	17	17	
	12–27		30	1,520,000	1.0	5,400	20	19	
17	11–29–32	M74	42	1,560,000	1.3	6,900	11	11	154/90
	12–9		44	1,540,000	1.4	11,500	13	13	
18	10–21–32	M	27	10,100,000	1.2	11,500	17	17	90/44
	10–29		42	2,170,000	1.2	7,300	28	28	
19	10–22–32	M48	27	1,180,000	1.2	7,400	17	13	
	10–28		50	1,390,000	1.1	6,800	28	30	
20	2–18–33	M57	64	2,330,000	1.2	4,800	17	17	118/64
	2–24		57	1,960,000	1.3	4,600	11	11	
21	2–21–33	M45	50	2,224,000	1.1	10,800	13	20?	
	2–28		52	2,270,000	1.2	8,300	18	20	
22	2–21–33	M64	60	2,420,000	1.3	6,500	11	11	116/70
	2–25		58	2,280,000	1.3	6,900	13	11	
23	2–20–33	M	51	2,650,000	1.0	5,500	11	11	110/50
	2–27		45	2,340,000	0.9	4,800	11	11	
24	2–25–33	F 50	45	2,090,000	1.1	6,000	11	11	
	3–3		—	—	—	—	13	13	
25	2–21–33	M	45	2,200,000	1.0	2,900	13	13	112/58
	2–28		48	2,230,000	1.0	3,200	11	11	

mic interne, and checked by Dr. Jacobson, the ophthalmic associate, and myself. In this wise, therefore, there could be no great discrepancies in the record of tensions.

The fundus picture in all was about the same—pale retina, no particular or constant change in the contour of the vessels, not even in the light streak which was neither more nor less accentuated. The vessels were not tortuous. Hemorrhages were rather infrequent in retina and choroid. The retina, as stated, was often pale and frequently had the straw-orange hue so often encountered also in nephritic and diabetic patients.

The optic nerve was not involved unless a coexisting cerebro-syphilis was present. In a few cases the optic nerve looked as if a neuritis were present, but a perimetric field test did not confirm it.

The intraocular blood pressure itself did not vary to any great degree, and conformed to the rise and fall of the systemic pressure.

With the recurrence of a normal or nearly normal blood picture the retinal hue and the vessel caliber and contour likewise assumed a normal appearance; the asthenopia also disappeared as well as the apparent photophobia.

In the pronounced cases, in which the leucocyte count was relatively high, it was often difficult to differentiate artery from vein in the smaller branches. However, in the large-calibered vessels the arteries were seemingly much lighter than the veins, though these were themselves not of a normal dark red.

Retinal-vessel pulsations were induced by very slight pressure upon the sclera, and with moderate pressure the small vessels were readily obliterated.

The venous pulse on the disc was more often absent than present, with a rather moderate systolic pressure the disc-vessel pulsation was present, while with a low systolic pressure the pulsation was absent. This vessel pulsation in itself is of no clinical significance excepting in cases with valvular heart lesion, then this vessel pulsation on the disc and beyond the disc assumes a diagnostic significance.

In one case only was there a suspicion of a *vis a fronte* papilledema, and in this one the tension was 9 mm. Hg (case 4). This papilledema (?) was not very pronounced, and is called *vis a fronte* in contradistinction to the classical papilledema, which can be designated as one due to *vis a tergo*. In the former the anemia permits of a peripapillar and even papillary edema, either serous or plasmic, while in the latter there is typical constriction and infiltrate of the nerve at its entrance into the eye, caused by the distention of the retrobulbar vaginal space of the nerve from increased intracranial pressure, affecting some or all of the intracranial spinal-fluid passages, also affecting the proper functioning and caliber of the ophthalmic artery and vein.

Neither of these papilledemata must be confused with that of pseudopapilledema, occurring in a leucemia, in which the so-called medusa head is the causative factor. This medusa head is a characteristic of a leucemia, either myelogenous or splenic, and not of any other type of anemia.

Discussion

In nature there is not a constant and unvarying immutability, but there are mutabilities, and in compliance with this law we find in the anemias cases with nearly normal intraocular tension, though the blood constituents are far below the normal. On the other hand, instead of having a rise in the tension as the blood picture improves, or nearly reaches normal, a decided drop in the tension occurs. However, these contrary exceptions are so few, that they rather prove the assertion that in all primary anemias there is a very noticeable drop in the intraocular tension, and conversely as the blood picture returns to normal in progressive stages, so does the tension return to normal (for the individual case) in stages.

The average normal tension is about 20-24 mm. Hg, either in each eye or a trifle more in one than the other, this being about the clinical average for all types of tonometers.

What the individual normal ocular tension for each of these cases is, could not be determined, as they all were definite clinical pernicious anemias upon

entry to the hospital. Their stay in the hospital was not until all findings were normal, but all were transferred to the ambulatory clinic as soon as the blood assumed a nearly normal aspect and the patient became free from any accessory symptoms.

As the clinical normal tension in the two eyes is not the same, so it was found that in these pernicious anemias the tension in the two was not always the same. In fact there was seemingly more often a difference than a uniformity. If there was a difference, it was rather constant throughout the course of the anemia. How to account for this is rather difficult, and we are at present unable to give a logical explanation, not even a hypothetical one.

In no case was there in either eye a purely local lesion, either active or arrested, excepting in the one agranulocytic anemia, which was the impetus for this study. In no case was there any cataractous process that could have a bearing on the intraocular tension—certainly none that would favor a decrease rather than an increase in the tension.

In view of the above remarks, it can be asserted that a reduced intraocular tension is a purely clinical manifestation in pernicious anemia, being *pari passu* with the rise or fall in the blood picture, and in no wise seriously affects the functional integrity of the eye unless intercurrent ocular conditions arise.

Any tonometer, in fact, first registers the ocular tissue resistance and then intraocular pressure, because the pressure of the contents of the eyeball keeps the cornea and sclera in a state of tension. As Duke-Elder says, tension is certainly due to the pressure but it is neither identical with it, nor does it vary absolutely with it. In actuality a tonometer measures the impressibility of the eyeball. The application of any tonometer must and does increase the internal ocular pressure, and this in itself is an inaccuracy. However, error is on the side of safety in taking tension with any tonometer applied to the cornea, and the values are of sufficient clinical accuracy to warrant deductions as to either high or low intraocular pressure, in determining the necessity for surgical or medical intervention to effect a control of intraocular tension, whatever its supposed pathologic origin.

Inasmuch as the eye constitutes a fluid system under equilibrium, the laws of hydrostatics are applicable to it; hence the pressure within the anterior chamber and the vitreous must be the same.

In young individuals the tension is higher than in adults, by about two or three mm. Hg; and, according to Marx (Med. Tij. Gen., 1923, v. 67, p. 1082) the tension of the right eye in left-handed individuals is higher than that in the left—accounted for probably by the pressure in the internal carotid artery. This observation was not made in any of the cases here reported as in none was there frank left handedness.

The intraocular pressure under normal conditions varies within the 24 hours. It is usually higher just before arising in the morning, and then rather suddenly falls shortly after arising, followed by a slow decrease until late evening, when it again begins to rise—rapidly in the first few hours of the night and then slowly. These excursions vary between 2 and 3 mm. Hg. They are not present in every individual and their cause is still a moot question. They are, however, of sufficient importance to serve as a guide in the administration of miotics.

The normal intraocular pressure is of rather wide range, the extreme low being 12 mm. Hg, and the extreme high being 35 mm. Hg (Schiötz), and 12 and 30 G.S., respectively. A persistent, rather low intraocular pressure is less significant than a persistent, so-called normal high pressure, as any intraocular inflammation, particularly iridocyclitis, in a case of the former, plays less havoc than in the latter, in so far as glaucoma is concerned.

In brief, the intrinsic factor or factors, obtaining within the eye or its adnexa, which produce this rather uniformly low intraocular tension during the course of the anemia are very difficult to ascertain. However, the following are some that enter into the problem.

1. The raising or lowering of the

pressure in the capillaries within the eye: The blood pressure in all the cases was much lower than the so-called normal pressure for the given age. The average age was 58½ years and the average blood pressure of the 25 cases was systolic 118 and diastolic 65. This is certainly a definitely lower blood pressure than normal even for the average age of 58. And, as the intraocular blood pressure for the average normal person at the age of 58½ years, with a normal blood pressure of 150/90, is about 70/35, we can readily see that in these anemias the intraocular blood pressure is also in proportion to their systemic blood pressure. The intraocular blood pressure rather closely follows the rise or fall of the systemic blood pressure, excepting in cases of intracranial increased pressure, when the former is relatively higher and rises or falls with the intracranial pressure. From the viewpoint of the hydrostatic pressure, the systemic blood pressure must to a certain degree have a bearing upon the intraocular tension or pressure.

2. The vacillating differences between the osmotic pressure of the capillary plasma and the intraocular fluid: Because of the pathologic cellular contents of the blood in these anemias, its plasma is also more or less altered, which certainly affects the constituency, both physically and chemically, of the intraocular fluids and thus causes a disturbance in the osmotic pressure.

3. Differences in the uveal capillary dilatation: There undoubtedly is a decrease in the uveal capillary dilatation, just as there is a decrease in the general systemic capillary dilatation. This dilatation is more or less dependent upon the systolic and diastolic pressures and upon cardiac function.

4. Variations in the quantity of intraocular fluid: Whether or not variation in the quantity of intraocular fluid exists in these anemias is difficult to prove, and in a large measure can only be a clinical conjecture, for, as yet we have no standard of normality for the eye, and even in the normal eye this may be a varying quantity without manifesting itself tonometrically.

5. Variation in the volume occupied by the vitreous (and possibly lens?): The same undoubtedly holds true for the varying volumes occupied by the vitreous and lens as it does for the varying quantity of intraocular fluid. Whether the vitreous itself is or is not of normal texture in these cases is a question difficult of determination. In all probability the vitreous in these cases is essentially normal, if anything it inclines to be fluid, and fluid vitreous is often found in decreased intraocular tension.

6. Variation in the turgescence of the sclera: The variations in the turgescence of the sclera may well play an important part in the status of the intraocular tension. Because of the altered cellular structure of the blood and rather uniform low systemic blood pressure, associated with a correspondingly low intraocular blood pressure, the sclera is, more or less, not so resistant and thus is more or less impressible when the tonometer is set upon the cornea, the weight of the former alone being the factor.

7. Possibly the tonicity of the extraocular muscles may be a contributing factor (after a fashion) in causing a variation in tension rather in favor of raising than lowering tension: As to the tonicity of the extraocular muscles' effecting intraocular tension, that, undoubtedly, is of minor importance in anemia. And, yet it cannot be altogether ignored, as all the body muscles themselves are certainly not of normal tonicity in any anemia. At any rate muscle tonicity seemingly plays but a very minor rôle in causing extremely low intraocular tension.

We may ask ourselves some questions:

Are intraocular hemorrhages the result of decreased intraocular tension in the presence of an anemia or of alterations in the vascular wall due to the anemia?

Is the color photopsia due to the anemia *per se* or to minus tension plus anemia? Does the minus tension favor thrombi and emboli? There may be some close relationship between the anemia and tension, for as the former improves the tension rises.

There apparently is no variation in the depth of the anterior chamber.

Is the aqueous altered in its chemistry in anemia?

Is the rather suffused retina due to the "anemia edema" (serum or plasma transudates because of altered retinal-vessel walls, permitting a diapedesis as well as a transudate of the plasma or blood serum or both) favored by the minus tension?

Why does retinal dialysis or detachment not occur, for we know that they do occur in so-called soft eyes?

Why were incipient cataracts not apparently caused to progress more rapidly than is usual?

Why do corneal ulcerations heal less rapidly and have a tendency to increase rapidly in size in minus tension than in normal? Is it because of lowered nutrition, resistance, or lower function of the fifth nerve?

Now no one type of anemia is more conducive to minus tension than any other, and yet why are certain types more prone to retinal hemorrhages than others?

Why are the exsanguinative anemias less prone to cause minus tension than the organic anemias?

Color and from confrontation fields show no variance from the normal field. Form fields are seemingly not affected, while the color sense may be somewhat less than normal.

Pupillary reactions are apparently not affected nor is visual acuity, nor accommodation, though asthenopia is frequently present—whether cerebral or ocular is difficult to determine, perhaps both factors enter into the production thereof. It is perhaps true that mental alertness is influenced.

Headaches are rather frequent and perhaps influence mental alertness and asthenopia. Low blood pressures as well as high do cause headaches.

Why are conjunctival infections seemingly not more prone to occur than they do in normal eyes?

Why in latent cerebro-spinal syphilis, with an anemia, does the optic atrophy progress so rapidly? because of lowered nutrition or the greater activity of the luetic toxin?

All these questions are being investigated in another series of anemia cases at Cook County Hospital.

Conclusions

1. The intraocular tension is markedly lowered in nearly every case of primary anemia, but particularly in the agranulocytosis and pernicious anemias —apparently in the aplastic anemia and leucemia the intraocular tension is also reduced.

2. Only with the return of a nearly normal or definitely improved blood picture does the intraocular tension return to nearly normal or normal.

3. The decreased intraocular tension in the anemias seemingly does not predispose the eye to any intraocular complications, though the anemia may be of a severe character or of long duration.

4. The prolonged decreased intraocular tension *per se* does not cause any marked functional complications.

5. If any ocular lesion accompanies the anemia, the former assumes greater seriousness and proves rather obstinate.

6. The decreased intraocular tension seems to bear a closer relationship to the hemoglobin and the red-blood-corpuscle count than to color index and the white-blood-corpuscle count.

7. A marked drop in the hemoglobin and in the number of red blood corpuscles and white blood corpuscles is accompanied by a drop in the intraocular tension.

8. A rise in these hemal constituents is accompanied by rise in tension. Not so infrequently does a reverse occur.

9. A variation in the blood picture during the course of the anemia is likely to be accompanied by a variation in the intraocular tension.

10. There was no case of hyperpiesis associated with the anemia.

11. No intraocular lesion was engendered during the course of the anemia.

12. No marked fundus-vessel alteration was noticed in any case.

13. In all cases the fundus had a more or less waxy hue.

25 E. Washington Street.

TWO CASES OF BUPHTHALMUS IN SIBLINGS

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The condition appeared in sisters after the first half year of life. In the elder operation was not performed until the age of sixteen months and three years, respectively, with the loss of one eye and vision of 5/200 in the other. The younger child was brought to operation at nine months of age with conservation of useful vision. From the Department of Ophthalmology and Otolaryngology, University of Minnesota. Read before the Minnesota Academy of Ophthalmology and Otolaryngology, February 10, 1933.

Buphthalmus, also called hydrophthalmus, congenital glaucoma, and infantile glaucoma, is a relatively rare disease of the eye. Parsons[1] in his textbook "The Pathology of the Eye" emphasizes the hereditary nature of the condition and cites a number of authors who have reported the appearance of buphthalmus in more than one member of the same family group. The writings which have appeared in the literature dealing with this subject during the past several decades have properly concerned themselves with its treatment. The two cases discussed herein are being reported, not only because of their occurrence in sisters, but also because of the excellent surgical results obtained in both of them following the Elliot trephining operation. The practically normal functional result obtained in the case of the younger child who was operated upon when nine months of age attests furthermore the need for the earliest possible surgical intervention in such conditions.

Adequate descriptions of the condition are to be found in textbooks of ophthalmology. Suffice it to say that the symptoms of the disease may all be explained on the basis of a rise of intraocular pressure and the extensibility of the infant sclera and cornea. The most striking feature of buphthalmus is the enormous enlargement of the corneal base which may even attain a diameter of 23.5 mm., while that of the normal adult cornea is 11.7 mm.

Buphthalmus is essentially a congenital and hereditary disease, and, according to Treacher Collins[2], is due to an abnormal persistence of the prenatal condition of the pectinate ligament. This, he states, is supported by the fact that strands of tissue stretch between the base of the iris and cornea. Reis[2] on the other hand, believes it is due to an obliteration or aplasia of Schlemm's canal. Parsons thinks that obliteration of these canals is probably secondary rather than a cause, as the partial or even complete obliteration of the canals of Schlemm in old cases of glaucoma is well known, and here it is almost certainly secondary. To demonstrate that buphthalmus makes its appearance at birth or before birth, Parsons cites Gros[2] who collected a series of forty-five cases, twenty-seven of which were diagnosed at birth or during the first week, and all but four cases were observed during the first three years of life.

It is well known that more than one congenital anomaly is frequently found in the same patient. Such is also the case in buphthalmus. It has been observed in association with other congenital anomalies such as coloboma of the iris (Zentmayer), neurofibromatosis (Vogt[7], Goldstein and Wexler[4]) and facial nevi (Jahnke[5] and Ballantyne[6]). The writer has recently observed buphthalmus in association with Schüller-Christian's disease.

Buphthalmus is to be distinguished from so-called juvenile glaucoma. The latter disease tends to appear during the second and third decade of life, has a decided hereditary tendency (Courtney and Hill[8]) and is otherwise indistinguishable clinically from chronic simple glaucoma of the middle aged and aged. Verhoeff[9], in the discussion of Courtney and Hill's paper, stated that he had examined the eyes microscopically in two cases of juvenile glaucoma and found a defective filtration angle similar to that in buphthalmus. He believed that in juvenile glaucoma, the outflow from the eye is not completely cut off in early life and that therefore there is not enough intraocular pressure to enlarge the globe. He concluded that juvenile

glaucoma and buphthalmus simply represent differences in degree of the same condition.

The treatment of buphthalmus is essentially surgical. Before the fistulizing operation became established, it was generally agreed that medical treatment held out no hope in these cases. In 1913, before the Elliot trephine operation was generally used, Zentmayer[10] reported the results of a questionnaire sent to a number of ophthalmologists relative to the type of treatment employed in their cases of buphthalmus. The answers to this questionnaire he tabulated as follows:

Iridectomy... fair results, 42 percent; poor, 58 percent
Sclerotomy... fair results, 28 percent; poor, 72 percent
Sclerectomy.. fair results, 40 percent; poor, 40 percent; encouraging, 20 percent

In 1925, Blake[11] also reported the results of a questionnaire pertaining to the same subject. This showed that the majority of operators were then in favor of the Elliot trephine operation. Fuchs favored the trephine operation, although he stated that iridectomy may be done if the keratome incision is small, as a large incision may lead to disastrous results. Spratt[12] performed the trephine operation as early as 1913 on one case with a satisfactory outcome. Fleischer[13] in 1918 reported a study of the trephine operation in buphthalmus in sixteen cases on twenty-three eyes. Satisfactory results were obtained in all of them and in eleven eyes which were followed from three-and-a-half to six years, a complete healing of the glaucoma resulted. He stated that the best results are obtained when the child is operated on before the age of one year. In this opinion he has the concurrence of all ophthalmologists who have had any experience with buphthalmus.

Report of cases

Case 1. E. R., female, aged 3 years, was first seen at the outpatient department of the University of Minnesota on March 22, 1927. During the first six months of her life, she was an apparently normal infant, after which the parents observed that her eyes were becoming enlarged. In June of 1925, when the child was sixteen months of age, the right eye was operated on but without success. The parents stated that the child was able to see somewhat with the left eye. The family history at this time was negative except that the mother of the child had a hyperopia of six diopters in each eye. Examination of the right eye showed a moderately soft atrophic eyeball. The horizontal diameter of the cornea measured 14 mm. The cornea had a large irregular area of opacity centrally. The iris was atrophic with greenish discoloration. Above, it was drawn up into the operative wound and the pupil was obstructed by a secondary cataract. There was no vision in this eye.

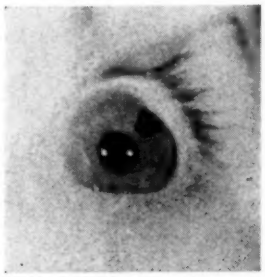

Fig. 1 (Hymes). Case 1, six years after operation.

The left eye showed a steamy cornea, 17 mm. in diameter. The anterior chamber was deep and the iris hazy. The lens could not be studied because of hazy media. The tension was undetermined but seemed elevated to palpation.

On April 4, 1927, an Elliot trephine operation was performed on the left eye. The eye was under considerable tension and the iris bulged into the trephine opening upon removal of the scleral button. A peripheral iridectomy was performed and the conjunctiva sutured. On April 13, 1927, the suture was removed under general anesthesia, the eye examined, and found to be in a state of hypotension; cornea clear, lens clear. The optic nerve showed a deep glaucomatous cup. The child during its operative convalescence at the hospital became aware of its surroundings, was definitely able to discern objects, and was apparently happy.

Case 2. J. R., female, aged 8 months (sister of patient in case 1), appeared

at the university dispensary in July, 1927. The parents stated that a month previously the cornea of each eye had begun to be hazy and that the eyes were enlarging in a fashion similar to that in the older sister's eyes. Examination

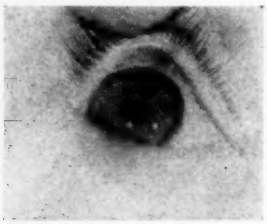

Fig. 2 (Hymes). Case 2, right eye, six years after operation.

showed eyeballs very much enlarged, corneas enlarged and steamy, and anterior chambers of considerable depth. Tension to palpation was definitely increased. The child was sensitive to light and apparently had some vision, as it was able to follow an object. The trephine operation was performed on August 19, 1927, on both eyes. A peripheral iridectomy was done on the right eye and a complete iridectomy including the sphincter of the iris on the left. On August 27, 1927, examination showed blebs over both trephine openings, corneas and media clear, tension normal to palpation. The child seemed interested in surroundings and people. She was discharged September 1, 1927.

These children were again examined on January 27, 1933, approximately six years postoperatively. The older child (case 1) had been making satisfactory progress at school in sight-saving classes. She walks to school unattended. Her eyes have remained unchanged; vision in the left eye was 5/200 uncorrected. The tension was normal. Retinoscopy of +2.00 D. sph. with a +1.00 D. cyl. axis 45° did not improve her vision. The media of this eye were clear, the optic nerve deeply cupped. The visual field showed a marked concentric contraction.

The younger child (case 2) had uncorrected vision of 20/40 in the right eye, and 20/20 in the left eye, the corneal base of each eye measuring 13 mm. Media of each eye were clear and the optic nerves normal. Tension and visual

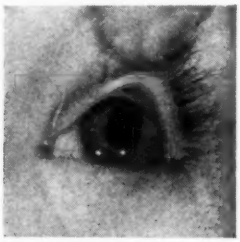

Fig. 3 (Hymes). Case 2, left eye, six years after operation.

fields were normal in both eyes. Retinoscopy showed:

O.D. +.50 D. sph. $\bigcirc$ 1.50 D. cyl. axis 180°.

O.S. +1.50 D. sph. $\bigcirc$ .37 D. cyl. axis 100°.

The surgical results obtained in these two cases indicate a complete cessation of the glaucomatous process in each of the three eyes operated upon and clearly demonstrate the necessity for early operative treatment.

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COMPLICATIONS IN CATARACT EXTRACTION

Cause, prevention, and management

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This survey of the field of cataract extraction does not lend itself to review. The writer advises the beginner to learn well the forceps method advocated by Knapp, or Elschnig, or Fisher's suction method before attempting Barraquer's vacuum-traction technic. Of all the complications, choroidal hemorrhage is most to be dreaded; it occurs most frequently in the presence of increased intraocular tension without increase of blood pressure.
From the Ophthalmological Department of the Chicago Eye, Ear, Nose and Throat Hospital. Read before the Chicago Ophthalmological Society, March 20, 1933.

It is impossible, even in the present state of our advancement, to tabulate all of the conditions that may be responsible for the many complications that may arise during and after cataract operation, although our knowledge is daily being enriched by personal experience and by the valuable observations recorded in the literature made by tireless workers of broad experience in practical work; still further by the results obtained in the laboratories of scientific research workers.

We should not be unmindful of the fact that there are undiscovered elements, hidden away in unexplored fields of which we know nothing, but yet which may be paramount in the causation of cataract complications. This paper will be confined to the known or generally recognized causes, ignoring the many theoretical ones that have recently been advanced.

From information gained from a study of the literature and personal experience, the author has divided the causes of complications in cataract extraction into four general groups:

1. Those due to the known or unknown pathological conditions in the patient at the time of operation.
2. Those due to the conduct of the patient during operation and convalescence.
3. Those due to the inexperience, lack of proper training, understanding, or the clumsiness of the operator.
4. Those in which there is a combination of two or all of the first three groups.

Pathological consideration

In a consideration of pathology present at time of operation, as has been said, it is impossible to discover all the conditions even with the practical and scientific knowledge at our command.

These pathological changes are either local or general, perhaps, more often, both. It should be remembered that in all cases of senile cataract, we are dealing with a pathological condition to begin with, for while cataract formation is considered the result of senile changes, it is common knowledge that there are other senile changes in the eye that are far more common than cataract formation. Two, in particular, that make intracapsular extraction possible, are the toughening or thickening of the lens capsule, and the weakening of the zonula, both of which are recognized as senile changes. The cloudy vitreous and the thin cornea in older people are other local changes with which we are all familiar.

Local pathological conditions, such as corneal opacity, posterior synechia, shallow anterior chamber, degenerative changes, atrophy of the iris, liquid vitreous, changes in the lens, as noted by Von der Heydt[1], etc., lend themselves to cataract complications and accidents.

In 1911, D. W. Green[2] said, "A cataract patient should be free from bowel and bladder trouble, cough, dyspnea, dacryocystitis, chronic nasal disease, blepharitis, chalazia, and styes. Short, red-faced, thick-necked, heavy-set, fat persons, whose weight is out of proportion to their height, who eat and drink excessively and lead sedentary lives, and who are of the so-called bilious, gouty,

or rheumatic type, are not good subjects for cataract operation."

Preliminary examination

Preliminary examination[3] is most important in the preparation of a patient for cataract extraction, with the reduction of complications in view.

It is our routine, in preliminary examinations, to consider intraocular tension, blood pressure, the Wassermann reaction, blood sugar, blood urea, basal metabolism, x-ray of the sinuses and teeth, smear and culture of the conjunctival sac (following Elschnig's[4] method of using blood serum with which to extract the bacterial flora for the culture), examination of the gums, teeth, throat, tonsils, and lacrimal sac.

A study is made of the patient's personal habits and mental condition. Any undue apprehension as to possible pain during the operation or possibility of losing the sight of the eye should be corrected and the patient should be brought to the operating table with full confidence in his surgeon and an optimistic outlook for the future of the eye.

Such pathology as abscessed teeth, infected lacrimal sac, or sinus infection, increased intraocular tension or blood pressure are eradicated and the tissues brought back to as normal a condition as is possible before the time of operation.

Blood pressure and intraocular tension: Much attention should be given to blood pressure and intraocular tension —especially to the latter.

Although I have discussed in another paper my findings based on a study of cataract complications in relation to intraocular tension and blood pressure, which brought out many interesting facts concerning intraocular tension, one or two points should be mentioned here.

Choroidal hemorrhage seemed to be more common in cases of increased intraocular tension, although the blood pressure was not increased; while infections were most common in cases of both low intraocular tension and blood pressure. Iris incarcerations occurred most frequently in cases of increased intraocular tension and normal blood pressure; in hemorrhages into the anterior chamber both were normal. While the condition of intraocular tension and blood pressure is no positive indication by which operative complications can be foretold, it is always a good rule to be very suspicious of cases with increased intraocular tension.

Age of cataract patient: The age of the patient has much to do with the rapidity of healing; it is more rapid in younger individuals, other conditions being equal. In a study of 4,730 cases of cataract extraction Gradle[5] found the average age to be 65 years. This corresponds with my age average in the American patient, while in the Indian patient it is 55 years. The age average seems to have been reduced, due, perhaps, to the fact that since the general adoption of the intracapsular operation patients are operated on at a much earlier stage of cataract formation. Parker's[6] report in 1921, of 1,421 extractions gives the average age at 72 years, the youngest being 51 and the oldest 82.

In consideration of the above, it is my practice of recent adoption, to operate on cataractous lenses as soon after they are discovered as is practicable, not waiting for the on-coming cataract in the other eye to cause an impairment of vision. Elliot[7] has advocated the same procedure.

Prognosis from slitlamp findings: The slitlamp has proved an indispensable aid in the discovery of conditions which may point to potential danger—shallow anterior chamber in glaucomatous eyes without increased tension; interstitial corneal deposits, unnoticed by the unaided eye, which may tend to lessen the visual acuity after operation; atrophy and senile changes in the iris; and, most important, the condition of the lens and its capsule, the study of which enables the surgeon partially to foretell the possibility of ruptured capsule, especially important when capsule forceps are to be employed. Complete[8] or mature cataracts in which the cortical opacities extend directly to the capsule, intumescent cataracts, and those with tense capsules result in the greatest number of burst capsules, while those possessing a clear cortex in a greater or less degree, sclerosed lenses, and clearer lenses showing a rather

thickened posterior capsule, result in the least number of burst capsules.

Operative considerations

Method: A well-placed incision is probably the best measure towards an uncomplicated extraction. This can be perfected only by much practice but is within the reach of anyone who is interested sufficiently to practice on six-weeks-old kittens, as described by Dr. Fisher.

Every method of cataract operation has its merits, however great or small they may be, but traction with well-regulated external pressure is the principle upon which all operative methods should be based; whether the traction is accomplished by forceps or vacuum is, of course, a matter of individual choosing. Personally, I prefer the suction method of traction, as performed by Barraquer[9], with very little modification, mainly because it results in fewer burst capsules.

The beginner, or those with little experience, should use the forceps after the method of Knapp[10], or of Elschnig[11], or the suction method as described by Fisher[12]. After the operator becomes more proficient with these methods it will be time enough to adopt the vacuum form of traction.

Barraquer is of the opinion that operative complications are always avoidable inasmuch as they are due to defective technic. This statement coming from an operator of such great skill as Dr. Barraquer should be a warning to all aspirants to cataract fame, as so much depends upon the dexterity and the mastery of the technic to be employed.

Wound closure, which even up to seven years ago had aroused but little general attention, is now considered of paramount importance to a successful result. The conjunctival flap should be well sutured, the stitches being placed in the flap as near to the cornea as possible and quite high in the bulbar conjunctiva so that the stretching of the conjunctiva will hold the scleral incision rather snugly in place.

Other forms of wound closure have their merits. Among them some recently described as Verhoeff's[13], Spratt's[14] pocket flap, Wolfe's[15], Higgins'[16] and others. However, some operators still claim there is no great value in sutures to close the wound.

Complications

Hemorrhage into the anterior chamber during operation is a complication more common in recent years since getting away from the corneal incision and making the incision in vascular tissue. It arises most frequently from the vessels of the limbus and less frequently from the iris, and is most common in cases of vascular disturbances of the uvea and conjunctiva, increased intraocular tension[17] and hypertension also being possible causes.

Adrenalin-chloride (1:1000) instilled into the eye before operation lessens the frequency of hemorrhage. In case of blood in the anterior chamber, operative procedure is almost impossible until the blood has been removed. This is best accomplished by allowing a small stream of sterile water to flow over the incision while the cornea is gently massaged from below upward with a spatula or the utility cataract forceps. Sterile air has been advocated[18].

Vitreous loss is a complication that is unavoidable in some cases; however, a well-chosen and executed technic, a well-trained assistant using lid hooks, and a confident patient will do much to lessen its frequency. It rarely occurs in an operation in which the lens is extracted by traction or traction combined with mild expression. Liquid vitreous, too much pressure in an attempt at expression, and a noncoöperative patient are conducive to vitreous loss.

Akineses[19] after the manner of Van Lint and the use of lid hooks in the hands of a well-trained assistant are recommended to combat this condition. Liquid vitreous sometimes causes a very deep anterior chamber to form directly after cataract extraction. This can be corrected[20] by inflating the anterior chamber with sterile air.

Burst capsule: To me, burst capsule is a more dreaded complication than loss of vitreous, and much can be done to lessen its frequency: Knapp's method of subluxation of the lens and subsequent delivery by expression; Elschnig's

method of combining expression with traction; Barraquer's vacuum method, and the new suction method recently described by Fisher, have all been designed for the purpose of lessoning this complication. In cases, in which a slit-lamp study has determined the presence of a weak or tense capsule or in those in which the pupil fails to dilate, a complete iridectomy should be done to lessen the resistance furnished by the iris, when attempting to extract the lens through the pupil.

A capsule broken during extraction should be removed from the eye before the operation is completed. This is best accomplished under a carbon-arc light with a uviol or blue-glass filter, which enables the surgeon to see the capsule in most cases; then, raising the cornea with the cataract utility forceps in one hand, which opens the globe and removes all obstruction to the surgeon's view the capsule can usually be picked up and extracted with the capsule forceps in the other hand. If a capsule can be removed in this manner, the same results can be obtained as if the cataract had been removed in capsule. If the capsule cannot be removed in this way, the lid hooks should be removed and a lid speculum inserted; the resulting pressure will force the capsule well up into the pupil where it can be easily grasped.

Accidental iridectomy with the cataract knife during incision, unfortunately, cannot always be avoided. It is, however, not a very detrimental complication, but destroys the possibilities of having a round pupil after operation. If, during the incision, the iris is seen to fold over the edge of the knife, nothing can be done to avoid cutting it, and the incision should be completed in the usual manner without any attempt being made to avoid cutting the iris, for a perfect incision is more important than a round pupil. This cutting of the iris can often be avoided by making a bold forward cut without delay after the counter puncture has been made, with a slight upward pressure on the handle of the knife until the edge of the knife has passed the pupillary border at which time the danger is over. A slight upward pull on the fixation forceps during incision should lessen its frequency.

An everted flap always leaves a blind eye, but it should never occur where sutures have been used.

Striated cornea is thought to be due to trauma of the endothelial cells covering Descemet's membrane. It occurs more often following the Barraquer operation, especially in cases in which the lens is brought out straight by the suction cup and less frequently when the lens is tumbled, for in these cases, the suction cup does not touch the endothelium in a violent manner. Elschnig[2] finds it quite rarely following forceps extraction but claims it is more common following the capsulotomy operation. It usually clears up in a few days.

Postoperative hemorrhage into the anterior chamber is a much dreaded complication. It is usually caused by a separation or partial separation of the wound which may open a limbus vessel. It occurs less frequently from the iris. Trauma is its most frequent cause. It is best treated by rest, atropine, and the application of the infrared ray. The blood is usually carried away in from two to seven days with no detrimental after-effect. Occasionally, however, it requires weeks for the anterior chamber to clear and in one of my cases of long standing there was a remaining fibrous exudate sufficiently heavy to be needled.

Reopening of the wound is a grave complication, as it may result in adhesion, incarceration, prolapse, or hernia of the iris[21]; also prolapsed vitreous, collapsed anterior chamber, hemorrhage into the anterior chamber and subsequent iritis. It is often caused by trauma; sometimes by restless patients turning unaided in bed during the first few hours following operation. Proper suturing of the wound after extraction, has greatly lessened this condition. A metal shield over the eye will sometimes ward it off. The patient should be kept quiet for the first 24 hours.

Iris and vitreous prolapse are always the result of reopening of the wound[22], or the failure of the wound to close following the operation. In cases of iris adhering to the wound or slight iris prolapse discovered soon after the occurrence, Elschnig has been able to relieve the condition by using gentle massage with cocaine as an anesthetic.

Much can be done to prevent these complications at the time of the operation, as in cases where the iris or vitreous cannot be easily replaced but persist in the wound, it is well to close the eyelids and wait for a few minutes; then when the eye is opened it will often be found that the anterior chamber has reformed and that the iris and vitreous have returned to their proper positions, after which the sutures can be tied and additional ones placed, if necessary. Vitreous[23] prolapse is no more frequent following intracapsular extraction than following extracapsular extraction. It is best to wait from five to seven days or oftentimes longer before any repair, where iris or vitreous prolapse has happened, is undertaken. Such procedure, if prolapse is large, is best performed by making a conjunctival flap; then, having cut off the prolapsed tissue, cover the incision with the conjunctiva. If the prolapse is not too large, it can be reduced by cauterizing with electric cautery or by using the monospark from the high frequency current. Gale[24] used electro-coagulation for the treatment of this condition.

Choroidal hemorrhage is the most dreaded of all complications during and after cataract extraction. In a search of my records where 2200 cases of cataract extraction, together with intraocular tension and blood pressure, are recorded, it was found that 17 choroidal hemorrhages had occurred, representing 16 patients. This is an average of .75 percent. It was also noted that the average intraocular tension for the 17 cases was 43 (Bailliart) and the blood pressure practically normal.

In India, in 1927, we reduced the percentage of choroidal hemorrhages from 2 to .9 percent by watching for the patients with high intraocular tension. If the tension was 50 or more (Bailliart), an attempt was made to reduce it, or an extracapsular operation was performed. Since beginning this study at that time, my observations have led me to consider all cases of increased intraocular tension as cases of potential choroidal hemorrhages.

Iritis[25] occurs more frequently after the extracapsular operation than following the intracapsular. Elschnig[4] gives the percentage following extracapsular extraction as 5.8. percent and following intracapsular extraction, .87 percent. Lens cortex or capsular remnants left in the anterior chamber, trauma, circulatory disturbances, iris adhesions in the wound, increased intraocular tension, hemorrhage into the anterior chamber, are some of the possible causes.

The treatment is atropine and infrared-ray applications, autohemic injections, milk or other foreign proteins. Krauber[26] uses atophan as a prophylactic and for curative measures. Iridectomy is sometimes resorted to. Iritis is one of the most difficult postoperative complications to manage.

Glaucoma after cataract extraction may come on soon, or may not be noticed for years after. Inasmuch as glaucoma is associated with senile changes in the eye, it must be expected that it will be found in a certain percentage of postoperative cataract cases due to causes other than the effects of the removal of the cataract. A certain percentage, however, is due to the latter. Its cause can be traced oftentimes to an iris adherent to the wound or to the vitreous body or to frequent attacks of iritis; also to remaining portions of lens capsule or much cortical substance after extraction. The treatment is carried out along the lines usually adopted for glaucoma, as instillations of eserine or pilocarpine, trephining, or iridectomy, and the removal of focal or general infections.

Among the more unusual complications which might be mentioned are the complete removal of the iris during an attempted iridectomy[27], and the making of an incision downward instead of upward during operation. These complications are avoidable and should never occur if the patient is properly instructed and the operator well trained. Other complications such as epithelial growth[28] in the anterior chamber, implantation cysts[29], and (a rare complication which occurred in one of my cases) a cilium in the anterior chamber which was later removed with no ill effects, are known sequelae.

Summary

Complete preliminary examination, surgical judgment, operative skill, individ-

ual alertness, and mastery of the modern operative technic are the greatest contributions to the reduction of operative and postoperative complications on the part of the surgeon.

Traction, accompanied with proper external pressure, is the proper force in cataract extraction.

A study of intraocular tension, blood pressure, and the findings from the slitlamp examination furnish valuable prognostic aids to the surgeon.

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RELATIONSHIPS BETWEEN OPHTHALMOLOGY AND OBSTETRICS

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This paper does not lend itself to review. It recites in brief the eye conditions associated with pregnancy, parturition, the puerperium, and the lactation period, together with those affecting the infant while under the obstetrician's care. The manifestations that require interruption of pregnancy are cited. Read before the Brooklyn Ophthalmology Society, February 16, 1933.

The potential field of ophthalmology may be said to antedate that of obstetrics by the period which elapsed between the creation of Adam, whose eyes looked upon the bounties of Eden, until the time when Eve conceived Cain, her first-born.

While there is little doubt that the practice of obstetrics began earlier than that of ophthalmology it is interesting to note that the written records would make it appear otherwise.

The earliest record, according to Fair[1], of the practice of midwifery is found in Genesis[2] in the description of what appears to have been a spontaneous version, in an arm presentation, during the delivery of Tamar's twins. This occurred about 1725 B.C. The same writer states that the first record of a physician's attendance at a delivery shows that this took place in the beginning of the Christian Era when the Emperor Augustus summoned Antonius Musa to care for the Empress Livia during a difficult labor.

Although the date of the beginning of the practice of ophthalmology is unknown, its first recordings, as quoted by Shastid[3], appeared in the "Code of Hammurabi" in the year 2250 B.C., or about 500 years before the first written obstetric record. Even at that early date the ophthalmologist's life was not without its just and unjust rewards, for it was written in the law that if a physician opened an abscess in a man's eye with successful results he was to be well paid, but if his surgery failed and the eye was destroyed he was to have his fingers cut off. Those of us who practice the ophthalmic art today are indeed fortunate to be able to say, "How times have changed."

The progress of both ophthalmology and obstetrics was not rapid through the ages. The last 100 years have added immeasurably to the advancement of both as individual sciences and since the invention of the ophthalmoscope by Helmholtz in 1851, there has been a slow, but progressive, march forward in cementing the relationships between these two fields of scientific practice.

In a consideration of some of the more important relationships it would seem advisable to classify the various ophthalmological findings as they are noted in the different phases of obstetric practice, such as pregnancy, parturition, the puerperium and the lactation period, and to include some comment upon a few of the more common ocular conditions of the new-born whose care, depending upon circumstances, may be in the hands of the obstetrician for a variable period of time.

In the diagnosis of pregnancy ophthalmological tests are of doubtful value. The one suggested by Bercovitz[4] in which the patient's serum is instilled in the conjunctival sac producing, as he states, a primary spasm of accommodation with no later reactions in normal women but with a subsequent contraction or dilatation of the pupil in 80 percent of pregnant women, has not proved to be so conclusive in the hands of other investigators. White and Severence [5], in a series of 73 cases thus tested, found the diagnosis to be incorrect in 43 cases, or an error of 57 percent.

The list of ocular conditions found in pregnancy is a long one and the many findings are of varied significance. White[6] estimates that at least 90 percent of pregnant women present some subjective or objective ocular symptoms during their pregnancies.

Such conditions as sties, blepharitis, keratoconus, phlyctenulosis of the conjunctiva or cornea, refractive changes

and relaxation of either extrinsic muscles or the muscles of accommodation may be attributed to the general impairment of nutrition resulting from the added burden of work thrust upon the pregnant woman's metabolism. Hence, the consequent symptoms of these conditions, including such subjective complaints as blurred vision, headaches, diplopia, hemeralopia or night-blindness, etc., may be considered as at least a partial index of the patient's nutritional status and in many cases will be relieved by proper rest and supportive measures.

Graef[7] calls attention to the possibility that emotional influences and hysteria may produce such symptoms as fatigue or distress of the eyes after their use, multiple vision, sensitivity to light, modified fields of vision, and even blindness, without any apparent pathology. However, he warns that such cases may be due to circulatory or toxic disturbances of such low grade as not to be noted or diagnosed.

The most important, and perhaps the commonest, ocular findings are those of albuminuric retinitis with or without hemorrhages and exudates, optic neuritis, neuroretinitis, retinal and papillary edema or choked disc, retrobulbar neuritis, and amaurosis. These are the ophthalmologic guides in the diagnosis and management of the toxemias of pregnancy and constitute the strongest link in the relationships between ophthalmology and obstetrics.

In a recent report of two cases of pernicious vomiting or pregnancy associated with hemorrhagic retinitis without edema, exudates, or apparent disease of the retinal vessels, Stander[8] concludes that the etiology of this complication of pregnancy may rest on a toxic basis. He draws this conclusion on the autopsy findings of one case which showed central necrosis of the liver and anterior pituitary lobe, similar to that found in cases of eclampsia which come to the autopsy table. Since this pregnancy was not interrupted and the other case was terminated by early abortion, with restoration of the patient's vision within two weeks from the time of operation, it would appear that the presence of hemorrhagic retinitis in these cases is a dangerous prognostic sign and justifies the early interruption of pregnancy.

Relative, also, to pernicious vomiting of pregnancy, Banister[9] has pointed out that, while in the simple reflex or so-called neurotic type and even in the mild toxic forms the fundus findings are usually negative, the earliest sign of the severe form may be a halo of cloudiness about the disc, due to edema. This phenomenon is indicative of a general toxicosis and its detection may be of inestimable value as regards the expectant treatment to be instituted.

Eclampsia and the preëclamptic state may present any of the above-mentioned more common and more important ocular findings with varying subjective symptoms, such as blurred and gradually diminishing vision, seeing everything colored red or green, sparks or spots before the eyes, fluttering vision, and sudden partial or complete blindness.

The albuminuric retinitis occurring in toxemic pregnancies does not differ materially in ophthalmoscopic appearance from the retinitis of renal origin not produced in pregnancy. However, there is no doubt that it shows a greater tendency to clear up after the pregnancy has been terminated and kidney function is restored. The type not associated with nephritis, the so-called "retinitis gravidarum," usually gets well leaving either no apparent fundus changes or perhaps only a few small atrophic areas. In fact White[6] believes that many cases of retinitis, especially those which are not progressive and not associated with nephritis, may be permitted to go to term if kept under proper prophylactic treatment.

When albuminuric retinitis occurs with amaurosis and eclampsia the prognosis is serious for both mother and fetus, the mortality being variously estimated at about 50 percent. This severe form, with progressive diminution or sudden loss of vision and the fundus picture of retinal edema, flame-shaped hemorrhages, exudates with stellate arrangement in the macula, possible papillary involvement and often

with retinal detachment, occurs most frequently in the latter three months of pregnancy and more often in multipara. Its presence at any time throughout the period of pregnancy justifies the immediate termination of that pregnancy. This is the accepted opinion of many writers, including Dabney[10], Graef[7], Mayer[11], Stander[8], Tostevin[12], Banister[9], Douglas and Griffiths[13], Manes[14] and others. Some authors such as Lindgren, Schiötz, and Krückmann, as quoted by Mayer[11], believe that the fundus changes of retinitis cannot persist for more than 11 or 12 hours without permanent damage to vision. The method to be used to induce premature labor or therapeutic abortion in these cases is, of course, a matter of the obstretrician's judgment, but to be of real value it should be effective within 36 hours.

Various theories as to the cause of the retinal changes have been advanced. Graef[7] believes them to be due to vascular disease. That the retinal hemorrhages are the result of an increased permeability of the capillaries or a diapedesis and are not due to a rupture of the vessels is the opinion of Stander[8] and Douglas and Griffiths[13]. The more recent investigations of Mylius[15], in the histological examination of the eyes of patients who have died in eclampsia, draw one to the conclusion that functional spastic changes in the retinal vessels may exist for many weeks without producing organic changes in the vessel walls. His observations of the changes in the pigment epithelium would suggest that it is peculiarly susceptible and nonresistant to toxins and would thus help substantiate Mitchell's[16] opinion based on his report of two cases of retinitis pigmentosa following toxic pregnancies. Ophthalmoscopic evidence of spasm or narrowing of the retinal arteries may prove a helpful aid in the early diagnosis of toxemia. The degree of spasticity may be noted to vary in direct ratio with variations in blood-pressure and is thought, by Kyrieleis and Schroeder[17] to be the result of irritation of the mother's sympathetic system by toxins, probably derived from the fetus. This phenomenon is worthy of further study before its true value as a diagnostic or prognostic aid can be established.

When optic neuritis occurs in pregnancy without any demonstrable cause, other than the physiological processes of that pregnancy, it offers, according to Fuchs[18], a good prognosis even though the patient is totally blind. Even in those cases where a definite toxemic etiology is found, the prognosis is not always bad because of the usually short duration of the inflammatory nerve changes. However, in severe cases of optic neuritis, accompanied by marked symptoms of existing toxemia, and especially when associated with retinal involvement, the resultant visual loss may be great. Varying degrees of optic atrophy are the terminal result. Since these severe types are not only prognosticators of probable eclamptic convulsions to follow, but also often terminate with such great damage to sight, they call for drastic measures for their relief. The most important of these measures is the early control of the toxemia, which is best accomplished by emptying the uterus.

Retrobulbar neuritis may be present with or without other demonstrable signs of toxemia, as noted by Tostevin[12] in a case report. Its onset is usually ushered in by gradual or sudden loss of vision, central color-vision scotomas and a complete absence of any positive fundus findings. In these cases the toxins primarily attack the orbital portion of the optic nerve. Mild or moderate cases may clear up entirely with proper treatment of the toxemia. In some instances the diagnosis may not be made until some time later when, in a previously normal fundus, some arterial attenuation and atrophic disc changes are noted. Those cases which are the result of progressively increasing toxemia, nonresponsive to treatment and associated with proportionately progressive loss of vision, must have labor induced to avoid permanent damage to sight. The rapid restoration of normal vision following this procedure is often startling. Of course every other possible source of retrobulbar inflammation, such as coincident

foci in the nasal accessory sinuses and so forth, must be eliminated as causative factors before so drastic a procedure as the induction of labor is instituted.

Amaurosis or sudden and complete blindness in pregnancy is of necessity a dramatic complication. It may be the first sign of serious renal disease or of impending eclamptic disaster, often being followed in several days by begining convulsions and coma. The truly uremic type is usually rapid in onset and presents no abnormal ophthalmoscopic picture. The pupils are somewhat dilated in most cases, although they may be contracted, and the light reflex is actively present indicating an absence of involvement in the lower pupillary arc. There may be one or more accompanying symptoms of uremia such as vomiting, headaches, dyspnea and convulsions. The underlying pathology is a transient edema or circulatory disturbance in the cortical visual centers of the occipital lobe and is produced by toxic irritation. Because of the often temporary character of these cerebral changes the blindness may be very fleeting, clearing up, under proper treatment of the uremia, within several hours or days. It is important to bear in mind that this condition may complicate a case already suffering from albuminuric retinitis which does not present marked visual disturbances because of the location of the retinal lesions. In all events, with a pregnant patient presenting the symptom-complex of sudden blindness with normal pupillary reflex, normal fundus, and the toxic symptoms of kidney or liver insufficiency, the only rational treatment is immediate termination of the pregnancy. Such a procedure will, almost without exception, prevent the convulsions and coma of eclampsia and quickly restore the patient's sight. Mayer[11] has employed the use of lumbar punctures in these cases, injecting gravid-serum into the spinal canal. He reports results which appear favorable but usually the amaurosis returned with the onset of convulsions. He concludes that while the presence of amaurosis does not make the prognosis of eclampsia more grave, it is not advisable to delay the induction of labor in these cases. At best, any attempts to delay the issue must only be made in the presence of negative fundus findings and with the patient under careful and continued ophthalmologic and obstetric observation.

Sudden loss of sight also may occur, in very infrequent instances, as the result of a bilateral retinal detachment. This is caused by the extravasation of an unusual amount of subretinal edematous fluid, often aided by the presence of edematous folds in the retina, both being attributable to toxemia. With the termination of the toxemia the end results in these cases are more favorable than in detachments from other causes, complete restoration of vision frequently occurring.

In normal pregnancies there is usually a diminution in light sense probably due to nutritional disturbances in the retina and their effect upon the retinal pigment. In a series of 18 eclamptic cases recently studied by Santonastaso[19] he noted a proportionately greater decrease in light sense depending on the severity of the toxemia. He further noted areas of increased and diminished retinal pigmentation, thus again suggesting the marked susceptibility of the pigment elements to toxins. Further studies along these lines may prove helpful in adding another early diagnostic sign of the toxemia of pregnancy.

Physiological changes in the pituitary gland during pregnancy give rise to disturbances of vision, especially as regards the visual fields. The visual defects usually manifest themselves as concentric or bitemporal field contractions and are thought to be due to enlargement of the hypophysis with consequent pressure on the optic chiasm. Johns[20], following observations on a series of 29 cases, concluded that the field changes noted did not depend on enlargement or vascular changes in the pituitary gland but were probably due to its functional modification. That enlargement of the gland does take place during pregnancy was pointed out by Erdheim and Stumme[21] who, in a series of 150 autopsies, found that the average

weight of the hypophysis in nullipara was approximately 6 grams, in primipara 8.5 grams and increased to a maximum of 16.5 grams depending upon the number of pregnancies. In the opinion of Mills[22] 90 percent of all pregnancies show some symptoms of pituitary disturbance. Since the symptoms of pituitary enlargement or hyperactivity are visual disturbances, headaches, vomiting and epigastric or abdominal pain, it is not difficult to understand why some of these cases might be diagnosed as toxemias of pregnancy or preëclamptics and still never develop a true toxemia or eclampsia. In the presence of these symptoms and with no evidence of other pathology, either renal, hepatic, or otherwise, a careful study of the fundus and visual fields may be a decisive factor in determining the procedure to be followed in the treatment of the case. The value of such studies is emphasized by White[6] in calling attention to the fact that pituitary enlargement may produce optic nerve and retinal findings not unlike those seen in true toxemias with changes in the liver and kidneys. It is quite possible that the two cases recently reported by Schaeffer[23], in which the above-mentioned symptoms were noted during pregnancy in conjunction with papilledema and an increase in the pressure of the cerebrospinal fluid, might prove to have been due to pituitary enlargement rather than the result of toxic irritation of the choroid plexus, as he concluded. His suggestion of the use of lumbar punctures and injections of hypertonic solutions in conditions of this kind is perhaps worthy of trial.

Since the occurrence of serious ocular changes in one pregnancy does not predispose the patient to similar complications in subsequent pregnancies, except, perhaps, in those instances where chronic renal or hepatic pathology exists, there appears to be no logical reason for advocating sterilization in cases which have suffered severe ocular damage. A further argument against such a routine procedure, as pointed out by Averbach[24], is the resultant general physical and psychic effect produced by sterilization.

All the more important ocular symptoms and findings discussed above may have their onset at the beginning of, during, or immediately after labor, or may, when occurring during pregnancy, be continued through the parturition period. Their significance, under these circumstances, is unchanged. It is not unusual to see paralysis of extrinsic ocular muscles during or directly after labor. They may be associated with third, fourth, or sixth cranial nerve root involvement. These paralyses are commonly the result of cerebral hemorrhages and indicate the presence of vascular disease.

The puerperium is not always free of toxemic states as evidenced by the incidence of puerperal eclampsia. Here again, as during pregnancy, the ocular conditions produced by toxemia play an important rôle in diagnosis and are helpful guides in treatment. Retinal hemorrhages, with impairment of vision, may occur *post partem* in multiparas with frequent deliveries or in cases where there has been excessive loss of blood producing marked secondary anemia. One of the most unfortunate complications of puerperal septicemia is a suppurative panophthalmitis. The septic embolus from the pelvic focus of infection lodges in the choroidal or retinal vessels and extensive suppuration of the globe takes place. Since the end result of embolic panophthalmitis is usually complete destruction and atrophy of the eye it is indeed fortunate that the complication is a rather infrequent one.

General weakness and lowered resistance is often noted in the early lactation period. Such states predispose the patient to sties and relaxation or insufficiency of accommodation. The latter is associated with headaches, diplopia and inability to read or sew and such symptoms call for general supportive measures, rest and probably refractive correction. Fuchs[18] calls attention to the fact that optic neuritis may be present during lactation solely as the result of the physiological changes peculiar to that period. Under these circumstances it offers a good prognosis as to the restoration of sight. Rarely, retrobulbar

neuritis, with its attendant symptoms of loss of vision and negative fundus findings, makes its appearance during lactation, for even this period is not entirely without its occasional mild toxemias.

As regards the new-born the first ocular indication which presents itself to the obstetrician is the prophylactic care of the eyes directly after birth. Despite the many substitutes suggested and advised by as many writers, the instillation of a 1- or 2-percent solution of silver nitrate, as advised by Credé in 1884, still remains the safest and most efficacious method. The writer has seen a number of cases of so-called silver-nitrate conjunctivitis occurring usually about 2 or 3 days after birth, associated with moderate inflammatory symptoms and causing no little concern to those in charge of the nursery. Proper flushing and cleansing of the eyes with a boric acid wash before and not directly after the instillation of the silver solution and the use of fresh solutions will do much the prevent such reactions. Considering all the causes of blindness, the reduction of those due to ophthalmia neonatorum from 30 percent to about 12 percent in approximately 30 years, as noted by Williams[25], removes all doubt as to the value of the prophylactic procedure. However, it is well to remember that the Credé treatment is only of use for the cases which may develop during parturition. Continued care must be exercised to prevent those cases which are due to infection after birth from vaginal discharges of the mother or from other infected infants. Purulent conjunctivitis of the new-born may be caused by numerous other organisms such as the pneumococcus, streptococcus, and colon bacillus. From the recent investigations of Torres[26] we may conclude that the duration of labor has a definite influence upon the occurrence of this condition, the incidence being greater in those cases where labor is prolonged. A metastatic panopthalmitis, with consequent loss of the eye, is a rather rare but disastrous complication of infections of the umbilical cord. Hence, if the dressing and care of the cord are relegated to the nurse, the obstetrician should not fail to inspect regularly and supervise that care.

During instrumental deliveries every effort should be made to prevent injury to the child's eyes, for with direct trauma irreparable damage may be done. Lack of proper application of the forceps blades or difficult extractions can produce pressure injury to the base of the brain with hemorrhage and consequent damage to the nuclei of the ocular muscles. Here, with involvement of the third and other cranial nerves, ptosis of the lid, deviations of the eyes and various associated symptoms present themselves. Occasionally lid ptosis occurs in spontaneous deliveries, probably as the result of supranuclear changes, as pointed out by Gasteiger[27]. In this type are found the phenomena of associated movements in which, as in the case he reported, on opening the mouth the ptosed lid elevates.

The types of ocular congenital anomalies which may be found in the new-born are great in number and the enumeration and description of many of them would have no proper place in this paper. There are, however, several more common conditions of this kind which the writer believes often present themselves directly to the obstetrician or, in those instances where his supervision of the infant continues beyond the lying-in period, they may be later brought to his attention by the anxious mother.

Of these more common forms the so-called congenital nystagmus is perhaps worthy of mention. The presence of this symptom presupposes the existence of some vision since, as Fuchs[28] states, those born totally blind never have nystagmus. Irregular and coarse nystagmus, due to lack of proper fixation, may occur during the first three months of life without any pathological cause. It may be attributed to the fact that during this period the finer functions of the fixing fovea are developing and the practice of fixation is improving. Many cases of nystagmus make their appearance only some little time after birth and have a definite pathological background such as congenital abnor-

malities of the retina and choroid, congenital cataract, opacities of the cornea, intraocular or cerebral hemorrhages, unusual refractive errors, and so forth. A congenital retinal hemorrhage which is subsequently entirely absorbed, leaving a negative fundus, may account for some instances where nystagmus exists without known cause. All cases of nystagmus in early infancy are worthy of a complete ophthalmological examination and should not be lightly dismissed.

Strabismus, or deviation of the eyes, is another anomaly occasionally seen in the new-born. It may be caused by birth injuries to the eye or to the nerves supplying the ocular muscles, as previously mentioned. There may be a congenital insufficiency or over-action or even absence of one or more extrinsic ocular muscles. In these latter cases direct heredity often is an important factor. When squint is first noted a number of months after birth it is possible that marked or unequal refractive errors may be at fault. Uncorrected by proper glasses these children can develop an amblyopia in the squinting eye from disuse. The writer has seen numbers of such cases of amblyopia ex anopsia in patients 8 years or more of age. In many instances a careful history from the mother brings out the fact that the squint was present from infancy but nothing was done for it because she had been advised that the child would "outgrow" the condition when it reached that peculiarly famous age of "seven years." Such advice is to be condemned since in many of these cases restoration of useful vision cannot be obtained at such late date. The early correction of strabismus by refractive or operative measures is imperative if useful sight is to be conserved or restored.

Finally, there frequently occurs one other congenital anomaly of the newborn, namely, stenosis of one or both lacrimal tracts. This is associated with epiphora. The mother complains that the child's eye always appears to be full of tears and that these frequently fall upon the cheek. There may also be noted a moderate amount of thickened purulentlike material presenting itself at the inner canthus. The lacrimal sac normally drains into the nasal duct and thence into the nose. In fetal life the lower portion of the nasal duct is closed by a mucous-membrane diaphragm which normally is perforated at birth. When this perforation fails to take place the consequent obstruction to the lacrimal flow results in the symptom of epiphora. Secondary purulent conjunctivitis or lacrimal-sac infections are not uncommon. When treatment with regular and gentle expression of the sac does not relieve the condition, within a reasonable period of time, probing of the lacrimal canal with instrumental perforation of the obstructing membrane is necessary. One such probing usually suffices to cure even those cases associated with marked purulent inflammation of the lacrimal sac.

From the enumeration and discussion of all the foregoing facts one cannot help but realize the importance and the meaning of these pathological ocular conditions, as regards their relationship to abnormal states, which occur in the various phases of obstetric practice. Upon the proper diagnosis and interpretation of the numerous subjective and objective ocular symptoms heretofore presented may depend not only the safety of the sight but even of the life of both mother and child. The writer believes that if routine fundus examinations were to be made regularly during pregnancy, and if every patient presenting symptoms of disturbed vision were given the benefit of a complete ophthalmological survey, many of the unfortunate instances of loss of sight or even life might be avoided. The value of better cooperation between the ophthalmologist and the obstetrician cannot be under-estimated and its achievement can only redound to the mutual advantage of both physician and patient. It has been the intention of the writer to encourage a better understanding of the more important relationships between ophthalmology and obstetrics and if these efforts do nothing more than stimulate a realization of the profound significance of those relationships they will, in a great measure, have accomplished their purpose.

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NOTES, CASES, INSTRUMENTS

OILS IN THE TREATMENT OF VERNAL CATARRH

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LOS ANGELES

So disappointing have been the many therapeutic agents introduced for the treatment of vernal catarrh, that one hesitates to offer a new remedy. Perhaps one excuse for this communication is that it claims no "cure" for the condition. It was noticed that the instillation into the conjunctival sac of any non-irritating oil, performed two to three times daily, was often followed by a remarkable improvement in the symptoms. The results were particularly good in the incipient stage of the disease, when the diagnosis, in the absence of hyperplastic changes in the conjunctiva, was based on the characteristic subjective complaints and on the finding of eosinophiles in the conjunctival secretion. Various oils such as olive oil, castor oil, and sesame oil have been tried without much variation as to their therapeutic effect. The elimination of free fatty acids from these oils accomplished by Scrini's method (shaking with alcohol, removing the alcohol by heating to 120°C.) seems to render them more efficacious. In very severe cases, in which the temporary use of local analgesics became necessary, I found a one-quarter to one-half percent solution of nupercain in sesame oil (prepared by Ciba, N.Y.) most satisfactory for a lasting relief of the itching, burning and photophobia.

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THE SWINGING STEREOSCOPE

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This simple invention, due to Miss Maddox and one of her brothers, may perhaps deserve a brief notice as representing the first introduction of motility into stereoscopes.

The object is to train the whole motor binocular field instead of, like an ordinary stereoscope, only the central parts; and at the same time its extensive movements stimulate the visual faculties, and keep the brain alert. Though small, it is a combination instrument which does the work of a stereoscope, of a duction apparatus, and of a near-vision myoculator.

The value of motion in squint training is now well recognized. Those indeed who have watched a modern squint training school will have noticed how frequently certain instruments are in side-to-side motion to secure that intense attention which is the *sine qua non* for effective training of any one of our faculties.

Credit must in fairness be given to Alexander Cameron's thoroughly original myoculator for first introducing the motion idea into squint training. Next, the makers of those useful instruments, the Synoptophore and Synoptiscope, endeavored to incorporate similar mobility into them, but only succeeded in doing so in the horizontal meridian, leaving the rest of the motor field unprovided for.

The swinging stereoscope supplies this deficiency by enabling even depth-perception pictures to be held together during continuous motion in the motor field; this rivets the stereopsis, and no doubt so fortifies the faculty that it responds with more alacrity to all its claims in ordinary life, thus peculiarly fitting it not for squinters only, but for ordinary motorists and aviators, whose third-dimensional perceptions need improving. Quick estimation of the distance and speed of an approaching motor car, for instance, is a faculty worth cultivating; and after a few preliminary investigations and lessons by the oculist, it is advised that the swinging stereoscope be kept on the dining-room sideboard or library table to invite two or three minutes' exercise after each meal, when the eyes are fresh and rested. That is better than a long tiring session. Special attention should be given to any part of the motor field the oculist has found most heterophoric. Aviators and motorists are frequently

glancing in oblique directions, so an ordinary instrument, which only effects straight-forward training, hardly meets their case. The swinging principle does.

For squint cases it is chiefly a "finishing tool," though useful at all stages provided the squint be either divergent or, if convergent, of very moderate amount, preferably first straightened by operation, and freed from false-projection.

It works best as one of a trio, with a cheiroscope (or one of its derivatives)

Fig. 1 (Maddox). The swinging stereoscope.*

for amblyopia, and one of the "synopto" instruments for convergent squint of high degree, or for the false-projection which is so important to conquer before stereoscopes are used at all.

The instrument is constructed as follows. From a small universal joint set as near the root of the observer's nose as possible, swings a pendant, to the upper part of which the lenses are fixed, while near the lower end the picture carriers are manipulated by horizontal duction screws. Below these the pendant ends in a little plunger which travels in a grooved arc, gently concave upwards as if described from the universal joint as center. This arc is pivoted at its middle so that it can rotate into any meridian required, and be fixed there by a thumb-screw, thus securing any diagonal movement necessary to educate especially an individual muscle. Along the flange of the grooved arc there are holes into any of which the plunger can be sunk. Then on loosening the thumb-screw a circular motion can be imparted to the picture-carrier with a large or small radius according to the hole chosen for the plunger to sink into.

It is advisable that a definite course of training should be followed, beginning with the static method after sinking the plunger in a hole and tightening the thumb-screw, so as to train depth-perception straight-forward and extend its amplitude by ductions; then work round increasing circles, first without and then with, ductions.

Conclusion. The swinging principle in stereoscopes can extend their utility to the whole motor field, or to any weak part of it, and bring those eyes within the range of training whose glances are frequently oblique.

Glenartney, Poole Road.

*Besides the instrument proper for the Surgeon's office, a minor free-swinging pattern is made for home use, preferably under occasional supervision. Both are supplied by Clement Clarke, 16, Wigmore Street, London, W.1., England.

A SIMPLE SUTURE NEEDLE FOR THE O'CONNOR CINCH SHORTENING MUSCLE OPERATION*

GAYNELLE ROBERTSON, M.D.
SAN FRANCISCO

Several dermal sutures are used in the O'Connor muscle operation threaded simultaneously onto a single needle. The needle originally described for this purpose is not entirely satisfactory, because it presents a bunch of sutures opposite the eye of the needle which is made somewhat less bulky by tying a second thread around the "cinching sutures" just beyond the needle.

Hosford and Hicks[1] recently de-

* From the Ophthalmological Service of the Department of Surgery, Stanford University School of Medicine, San Francisco, California.

scribed a needle which corrected the faults of the original instrument, but it is rather too intricate for operating room routine. Figure 1 gives a detailed

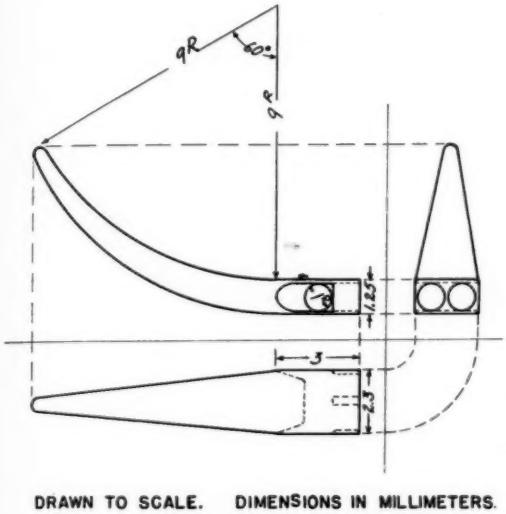

Fig. 1 (Robertson). Suture needle demonstrating a new type of eye.

working drawing of a very satisfactory needle. This instrument has no removable parts and should readily fit into the ordinary routine of any operating room.

Figure 2 illustrates diagrammatically how the needle is threaded.

The needle presents a new type of eye which should find application in various instruments using multiple sutures.

Stanford University Hospitals.

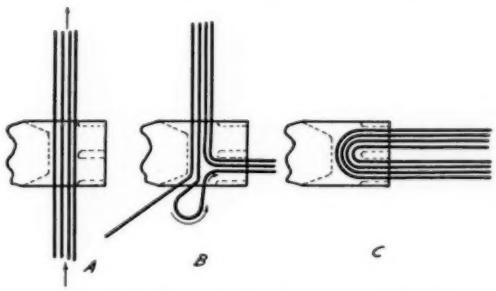

Fig. 2 (Robertson). Diagrammatic illustration of threading the needle. (A) All sutures are passed through the transverse channel first. (B) One by one all of the sutures are passed through the longitudinal channels first from one side and then from the other. (C) All of the sutures have been passed, and the needle is ready for use.

References

[1] Hosford, George N. and Avery M. Hicks. Two improved instruments for use in the O'Connor cinch shortening operation for heterotropia and heterophoria, Amer. Jour. Ophth., 1933, v. 16, no. 6, p. 528.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

ROYAL SOCIETY OF MEDICINE, LONDON

Section on Ophthalmology

June 9, 1933

Mr. A. C. Hudson, president

An operation for the relief of congenital ptosis

Mr. R. Affleck Greeves said that cases of congenital ptosis could be conveniently classified into partial ptosis with fair independent levator action and complete ptosis with little or no levator action but with good upward movement of the globe. In order to estimate the amount of levator action present in any given case, it was necessary to place one's hand firmly over the frontalis muscle while the patient attempted to open the eye.

For complete ptosis the results of plastic operations were, in the speaker's experience, disappointing on the whole, both cosmetically and functionally. Motais's idea of making the superior rectus muscle take on the function of raising the lid in addition to its normal one of raising the eye, had always impressed the speaker as being a good one. In ordinary circumstances, the upper lid and globe moved upwards and downwards in conjunction: therefore, theoretically, the result of the operation should be satisfactory. He had been fairly satisfied with the results of the Motais operation, as a general rule, but disappointments not uncommonly occurred. The chief cause of disappointment was the liability of the suture (holding the slip tendon to the eyelid) to give way within a few days of the operation, in which case the lid slipped back, and the ptosis remained unrelieved. Also, unless the attachment of the slip was exactly central, the lid was raised more on one side than on the other.

It therefore occurred to him that a better result could be attained by attaching the lid to the superior rectus muscle, instead of the reverse procedure. With this end in view he had devised the operation which he then described, aided by a diagram. It could be done under either a local or a general anaesthetic, though under the former some pain was caused when pulling on the superior rectus tendon. The eyelashes should not be cut. He had never found the sutures to give way or that the lid altered its position in any degree at any time after the operation. It was not necessary to insert conjunctival sutures. Great care must be taken to prevent exposure of the cornea during the healing stage. The best form of dressing was a sausage-shaped pad placed over the upper lid, which was kept in position by strapping and a bandage. The sutures could be safely removed in ten days' time.

Tar epithelioma of the lid margin

Mr. Charles Goulden and Mr. H. B. Stallard said that the patient, a tar and pitch-worker, aged 33 years, came with a number of small tumors at the lid margin. In June, 1926, he attended the Dermatological Department of the same hospital for a small pigmented wart at the right angle of the mouth, and another on the left side of the upper lip. A few days afterwards radium was applied for two hours. A month later radium was re-applied to the left upper lip for two hours. On August 24 the patient was reported cured. In November, 1927, he returned with a wart on the left cheek. Applications of unfiltered radium were made for two hours on November 5, 1927, and again on February 14, 1928. In March another application of radium to the growth was made, this time on the left cheek. He also had a rapidly-growing warty tumor in the region of the left inner angle of the orbit, which was curetted, then radium applied for two hours. On April 27 this patient was referred to the speaker by Dr. O'Donovan, of the Skin Department, the skin lesions not hav-

ing recurred, but the man had a small swelling on the margin of the left upper eyelid. This gradually increased in size, without pain, and with only occasional itching. It was a small spherical tumor 3 mm. in diameter on the left upper lid: it had a broad base, and involved the anterior two-thirds of the lid margin, leaving the posterior edge unaffected. The tumor had smooth outer walls, which enclosed a small pigmented center, protruding a little above the general surface. The tumor was removed by passing a keratome through the sharp posterior edge of the lid, in an upward direction, and the small area thus isolated was dissected out by a wedge-shaped incision with scissors, involving the lash-bearing area of the lid, and its skin. The wound was closed with silk sutures.

Mr. Stallard reported that it was a squamous-cell carcinoma, its suraface being covered with a thick plaque of keratohyaline. There was evidence of prickle-cells and cell-nests. The line of excision had passed wide of the malignant cells. The histological changes were divided into three stages: 1. hypertrophy and hyperplasia of an orderly type and keratosis of the superficial layers, with an increase in the elastic tissue of the corium, mast cells, and lymphocytes; 2. some irregularity of epithelial cells, and keratosis of cells in the deeper layers of the epidermis; 3. evidence of keratosis, mytotic figures, hyperchromatic nuclei, loss of elastic tissue, and invasion of the corium.

Radium in ophthalmology

Dr. Roy Ward said that the eye conditions treatable adequately by radium were few. The radiosensitivity of the various parts of the eye and its appendages had an important bearing on the treatment. The ideal to be aimed at was the appropriate use of the difference in sensitivity between the diseased and the normal tissues. When this ideal was reached, the diseased tissues were destroyed, the surrounding ones being but little affected. Undifferentiated types of growth were more radiosensitive than more adult types. There must be a clear distinction between a marked degree of radiosensitivity and curability, for though the immediate response in the more anaplastic types of growth seemed satisfactory, the disease might spread rapidly, and early and general metastases ensue. The conjunctiva and the eyelids were the most susceptible of the ocular structures to radium emanations, the globe being comparatively radioresistant. The lens was the exception. Cataract was an important post-radiational effect, which might not appear until some time afterwards.

Eye conditions could be treated by either Beta or Gamma rays. For most eye conditions no great penetration was needed, therefore Beta rays were generally employed. Prolonged Gamma radiation was likely to lead to permanent damage, and this form must be avoided so long as the sight was good and the globe remained in position. Lesions of the limbus, conjunctiva, and cornea were treated only with Beta radiation, which was completely absorbed by half a millimeter of platinum, whereas over 90 percent of the Gamma radiation penetrated the same screen. Beta rays were therefore passed through only a very thin filter.

Exact localization was important, and it was necessary to use some device by which the ordinary flat applicator could be placed exactly in position, and maintained there with the minimum of discomfort. The head was placed between sandbags, and the patient was told to fix his gaze on an object, supervision being exercised to check any tendency for the eye to wander.

The common tumors of the conjunctiva and cornea were epithelioma and melanoma. The fact that the former usually arose near the limbus was favorable to Beta radiation, as applications could be maintained in that position easier. The exposure time depended to some extent on the thickness of the lesions (varying between 45 and 65 minutes). Usually the only reaction following was some transient conjunctivitis, commencing 10 to 14 days after the application. The full effect of the radiation was not apparent until 6 to

8 weeks afterwards. If, then, the lesion had not disappeared, a further exposure could be given. Melanoma of the conjunctiva was a less common tumor; it seemed usually to arise on an already existing nevoid base. The irregularity in shape of these lesions made it difficult to treat the whole at one time.

Primary tumors of the cornea were very rare, but they reacted well to radium. Mooren's ulcer was also rare, but was a very grave condition.

Spring catarrh was very intractable to ordinary treatment. The average age of these cases, treated at the Radium Institute, was 15.8 years, and there were three males to one female. The treatment of this condition consisted of repeated applications of unscreened radium to the conjunctival surface of the upper lid. Fifteen-minute exposures were given, and repetitions given at three-week intervals. If the reaction was not severe, the exposure time could be increased safely to 25 minutes. In some cases in which the disease affected the conjunctiva at the edge of the lid, it was sometimes convenient to evert the lid and to place an ordinary applicator on the exposed surface for the required time.

About 40 percent of the cases of spring catarrh could be cured by such a course of treatment and of the remainder, most were improved. In a minority, radium seemed to have no effect.

The most important benign conditions affecting the lids from the radium point of view, were nevi, and papillomata. Some nevi grew rapidly soon after birth. The cavernous and the raised red capillary nevi were suitable for radium applications, but not the "port wine" form. Early treatment was important, because the earlier they were treated the more sensitive they seemed to be. They were treated with lightly-screened radium. Sittings should be of 45 to 90 minutes' duration and should be repeated once or twice at intervals of six weeks. In cavernous nevus improvement took place over a period of six months or more after the last treatment. Papillomata were commonest on the upper lid, affecting the skin of the palpebral margin. They were usually of the papillated or filiform variety. For larger growths radium gave better results than electrolysis. Tar papilloma was very radiosensitive, and if not treated early it might become epitheliomatous. Short of this change, one application of radium generally ensured cure.

Malignant growths of the eyelids comprised epithelioma and rodent ulcer. The former could be either the hypertrophic type, with a center tending to undergo necrosis, or an ulcer with hard, everted edges. When the lesion did not involve the tarsus, Beta radiation was the method of choice. Usually an exposure of 60 to 80 minutes to unscreened radiation would get rid of the disease. Gamma rays should be used in the more extensive cases, especially if underlying infiltration was present. Radon seeds were more satisfactory than radium needles; they were easily inserted and removed, and because of their small size they could be placed in exactly the desired position, even when the lesion treated was irregular in form. The seeds used by the speaker contained 1.5 to 2 millicuries of radon, and were screened with 0.3 mm. of platinum. They were left in position three or four days, the actual time depending on the dose required and the size of the lesion. In cases in which the disease had spread to the bony walls of the orbit, radium was handicapped, and in most of those cases removal of the disease with the diathermy knife was the safest procedure, and this should be followed by radiation with heavily screened radium.

Rodent ulcer might affect the lids, especially the lower lid, but its commonest situation in relation to the eye was the inner canthus. Here, early treatment was particularly essential. When the lesion was not an excessive one, Beta radiation should be used, but the dose should be smaller than for rodent ulcer of the soft parts, on account of the presence of underlying bone. If on the other hand the lesion was extensive, radon seeds, with a screenage of 0.3 mm. of platinum and

a content of 2 millicuries, should be inserted around the lesion and left there four days. The more extensive rodent ulcers involving bone were, like epitheliomata, more resistant to radiation treatment, and if the lesion did not respond quickly, diathermy should be used. When the process had extended deeply into the orbit, the eye should be removed, not only to enable one to see the extent of the disease, but also to render possible adequate treatment.

Gamma radiation had also been found useful for glioma of the retina, the treatment of which was, primarily, surgical. But it was very radiosensitive. Foster Moore, Stallard, and Milner had done some very interesting experimental therapy with radon seeds. They used (mostly in cases in which the remaining eye had become affected) seeds of varying content up to 5 millicuries and screened with 0.5 mm. of platinum, and these were inserted by exposing the sclera and by excising it, the seeds being introduced into the growth through the incision and being left in position ten days.

The cases had been only few, but certain conclusions which were arrived at by them showed that it was a brilliant piece of work, and further results were now awaited.

Retrobulbar tumors, such as sarcomata, growing from less accessible parts of the orbit, were not suitable for radium treatment as a primary measure. In most of these cases, exenteration of the orbital cavity was necessary, and, where possible, this was followed by prolonged Gamma radiation of the affected region as a prophylactic measure. Except in rapidly growing anaplastic tumors, the effect of treatment could not be judged for about three months.

Radium therapy had been boomed, it had also been decried, therefore it was important that its limitations be recognized.

Discussion. Mrs. Phillippa Martin said that in her department rodent ulcers were treated with interstitial radiation. Scarring of the skin and telangiectasis were more common with Beta radiations. She had not seen scarring follow exposures to Gamma rays. Treatment of retrobulbar tumors was difficult, because of not being able to get behind the tumors.

Mr. Affleck Greeves said he had had two cases of epithelioma of the lids which disappeared like magic under radium treatment. Rodent ulcers did well with this treatment while they were limited to skin, but they were not so susceptible to radium when they had involved the conjunctiva. In the latter case excision seemed preferable. In the speaker's spring catarrh cases radium treatment had been disappointing. Radium had caused lymphomata to disappear rapidly. He had not tried it for Mooren's ulcer. He had seen some bad results from treating xanthoma with radium, as the resulting scars and telangiectases made the appearance of the patient more unsightly than before. In bilateral gliomata he recommended the external application of radium; he had had the opportunity of treating only one case in that way. He had a wax mask made, but, though shrinking of the tumor was affected, the child's father refused to bring her any more. He heard that the child was still alive and had her sight.

Mr. Humphrey Neame said he regarded spring catarrh as a self-limiting disease. It persisted three or four years, then responded to mild treatment and disappeared. Therefore when the condition disappared after radium treatment two or three years in succession, it was not at all certain that the result had been due to the radium.

Mr. H. B. Stallard remarked that he had made certain observations regarding the effect of radium on spring catarrh. In a series of cases some received treatment between February and May, at 4 to 6 weeks' intervals, and they did not suffer from recurrence in the year concerned, whereas if the treatment was omitted in the following year, the patients had a seasonal recurrence. One interesting case was that in which one eye was treated, and not the other. The treated eye had no recurrence in that year, but the untreated eye showed a recurrence. He asked whether Dr. Ward

had seen any form of chronic conjunctivitis following radium treatment, or corneal ulceration or necrosis in the same circumstances in cases of spring catarrh.

Dr. Ward replied that what he had set out represented an experience of 20 years at the Radium Institute. Chronic conjunctivitis certainly did occur in cases of spring catarrh if radium treatments were persisted in.

(Reported by H. Dickinson.)

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

February 21, 1933

Dr. Hugo B. C. Riemer presiding

Bitemporal hemianopsia in pregnancy

Dr. Paul Chandler reported a 25-year-old woman who complained of blurred vision and severe headache. She had been delivered of a full-term normal child two weeks previously. Pregnancy and confinement were normal. The vision had been increasingly blurred for the past three to four weeks, with moderately severe headaches during this time.

The objective examination of both eyes was negative in all respects. The vision was 6/9 in the right eye, and 6/30 in the left eye and could not be improved. Visual fields with 3/330 test object showed an absolute scotoma involving the upper temporal quadrant of each eye, passing squarely through the fixation point. The remainder of the temporal fields showed relative scotomas.

She was referred to the Peter Bent Brigham Hospital for study with the provisional diagnosis of pituitary tumor. Complete history, physical examination, neurological examination, x-ray of skull and sella turcica were done there. The history was negative; physical examination was negative except for the basal metabolism, —23; neurological examination was negative; x-ray of skull negative. She was sent home to report in two weeks.

Seven days later she was readmitted. At seven o'clock that morning she had had an attack of numbness of the right arm and left side of the face, with thick speech and temporary drooping of left lid. All examinations were negative except that the left pupil was slightly smaller than the right. There was slight nystagmus of the left eye and slight hypesthesia over the distribution of the second division of the fifth nerve. The right biceps reflex was exaggerated. Visual fields showed a definite improvement. The vision was 6/7 in the right eye and 6/12— in the left. After a few days she was again discharged and readmitted about two weeks later.

The morning of admission, on getting up, the right arm felt numb, and in a few minutes the left side of the face became numb. She could not speak, and developed severe frontal and left-sided headache. All examinations were again negative, except that there was a slight hypesthesia of the left side of the face as before: there was complete motor aphasia which lasted only a short time. A ventriculogram was negative. At that time the vision was 6/7 in each eye, and there was a marked improvement in the visual fields.

She was admitted again about six weeks later. The morning of admission she woke up with a numb sensation of the right arm, generalized body tremor, and slow speech. This was followed by severe frontal and temporal headache with tinnitus. At this admission all examinations were negative. The vision was 6/6 in the right eye, and 6/5 in the left. Visual fields were entirely normal.

Since that time there had been no symptoms of any sort. Now, eight months after the beginning of her trouble, the vision was 6/5 in each eye, visual fields were entirely normal, the eyes were objectively normal, and she was symptom free.

It was thought that she had some pituitary disturbance which was temporarily activated by her pregnancy. The symptoms of motor weakness and aphasia were entirely unexplained.

Paresis of internal recti with retention of convergence

Dr. Hugh C. Donahue presented a 33-year-old married man who entered the hospital one month previous com-

plaining of blurred vision with diplopia which had disappeared. The vision in both eyes was normal and fields were normal as well as pupils, media, tension and fundi. In testing the muscular excursions, extreme right external rotation showed the left eye to stop at the mid-line. Upon left external rotation the right eye passed just beyond the midline. There was limitation of upward or downward gaze, but a slight horizontal nystagmus at the extremes of these motions. Finger-to-nose test showed normal convergence. In other words, this patient had a paralysis of the internal rotations with no involvement of convergence.

Reviewing the literature, a few similar cases were found. The lesion was reported as being high up in the pons involving only the fibers of the posterior longitudinal bundle as they passed forward to the oculo-motor nuclei. Lues, multiple sclerosis, vascular accident, or a tumor was suspected in this case, the first two being the most probable.

He was sent to the Nerve Department where very interesting signs and symptoms were found. In addition to having diplopia, blurred vision and nystagmus, there were found hyperactive knee and ankle jerks, scanning speech, intention tremor, and although not a definite Romberg, moderate swaying. This patient presented several characteristic symptoms of incipient multiple sclerosis, the first of which were referrable to the eye.

Optic atrophy

Dr. Edwin B. Dunphy presented a 17-year-old boy who always had had poor vision in the left eye. Recently he thought it was getting worse following a slight abrasion. The left optic disc looked pale and the peripheral fields were normal. He was sent home and returned in two weeks stating that the vision in the right eye had now become affected. The visual acuity in each eye had dropped to fingers at one foot. Peripheral fields seemed normal. There were large central scotomata, and both optic nerves showed definite pallor with slight blurring of the disc margins. He was admitted to the hospital for study, with the diagnosis of retrobulbar neuritis. Thorough medical and neurological examinations showed nothing abnormal. X-rays of skull and sinuses were normal. The blood Wassermann and spinal fluid were negative. Nose and throat examination was negative. The vision did not improve and a definite optic atrophy was developing. Investigation for lead poisoning proved negative. There was no history of alcohol or tobacco. This was therefore, a case of rapid failure of vision with optic atrophy which had shown no tendency to improve. This brought up the possibility of a diagnosis of chronic cisternal arachnoiditis.

A series of these cases which were operated upon by transfrontal approach, exposing the chiasm where adhesions were found around the optic nerves had been reported by Vail and Heuer. Freeing of the adhesions resulted in restoration of vision.

Such an operation was suggested in this case, but was refused by the family. In cases of rather rapid obscuration of vision which had no tendency to improve and in which brain tumors, toxic amblyopia, sinus disease, retrobulbar neuritis, aneurysm and trauma could be excluded, the diagnosis of arachnoiditis must be considered.

Extreme chemosis of conjunctiva

Dr. Francis Skilling presented a 42-year-old housewife who developed pathology in the right antrum following the extraction of an upper molar tooth two and one-half years previously. One year later a radical antrum operation and another tooth extraction were performed, and a diagnosis of osteomyelitis was made. Five months ago there developed a swelling of the right cheek accompanied by pain. An extensive operation was performed by the external route, removal of the zygomatic process, most of the inferior rim of the orbit, and surrounding granulations. Diathermy coagulating current and rongeurs were used. Two weeks following this operation, chemosis and exophthalmos appeared, and had persisted for three months. X-ray reports were

negative for osteomyelitis. Canthotomy, incision and pressure bandages had not had any appreciable effect. The premolars of the right side were extracted. The patient had been at home for about two weeks. The vision at the time of her discharge from the hospital was about 5/200.

Traumatic dislocation of lens

Dr. William Liebman reported a 48-year-old wood-turner who had been struck in the left eye by an unfinished canoe paddle hurled by a power ripsaw. The vision was at once reduced to light perception. Examination at the hospital revealed a half-inch laceration at the inner aspect of the left eye, considerable swelling of the lids and conjunctiva, hyphaema, and pupil widely dilated. The zonule was ruptured temporally, and the lens dislocated into the anterior chamber. No fundus details were made out on account of hemorrhage. Under treatment the eye improved and the patient was discharged July 25, 1932, to return later for removal of the lens. Dr. Liebman saw the patient on August 4, 1932, when he complained of blurred vision, left eye, with no pain. The right eye was normal and corrected vision was 20/20. The vision in the left eye was fingers at one foot only, in the horizontal plane and about ten degrees nasally, to the medial line. The conjunctiva in the left eye was slightly congested, cornea clear, anterior chamber deep, especially temporally and below blood and vitreous were present in the anterior chamber, the iris markings were clear, there was no iridodonesis. The pupil was dilated ad maximum, round, but did not react (atropine mydriasis). The lens was dislocated backward up and in; the lower border of the lens was visible as a bright orange crescent, and was directed backward toward the retina to a point about two disc diameters to the temporal side of the disc. With a hand slitlamp one could make out very fine transparent strands running from the lower temporal region to the lens, which were probably stretched and torn zonule fibers. With rapid rotation of the eyeball, and changes in posture, the lens changed its position but slightly, incidentally being held in place by the unruptured zonule in the upper nasal quadrant. The vitreous was clear. There were pigmentary changes in the retina temporally to the disc; a large retinal hemorrhage in extreme temporal portion, and numerous retinal hemorrhages above. The tension was 5 mm. (Schiötz). The patient was using atropine solution in the left eye three times a day. On August 23, 1932, while the patient was quietly sitting, there was a sudden dull pain in the left eye, and within two hours, the pain became agonizing, and the eye exhibited typical symptoms of acute congestive glaucoma. The lens had dropped further back into the vitreous, and the eye was stony hard.

A subcutaneous injection of morphine sulphate gr. ½; intravenous 50 percent glucose solution, and a 500 cc. saline retention enema, in about one and one-half hours gave relief. Although the patient received intensive myotic treatment, it was necessary to repeat the glucose treatments a number of times to keep the tension down and to relieve pain. The tension was lowered to 40 mm. (Schiötz).

On September 7, 1932, under ether anesthesia, an iridectomy down and out was performed. There was considerable difficulty in grasping the iris. On September 9, the lens had come forward and occupied almost the normal position. There was no iridodonesis, and the patient was discharged from the hospital September 21. The eye was white and quiet and the tension 22 mm. (Schiötz). The patient was warned against strenuous exercise. He returned to work in November, 1932, and had no difficulty until January 8, 1933, when he sawed wood all morning and had another attack of severe pain. Dr. Liebman again found the eye stony hard, with very faint light perception. The lens had again become displaced up and in. Because of the extremely reduced vision, no attempt was made to remove the lens. Enucleation was recommended, and performed.

James J. Regan
Recorder.

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

September 27, 1933

Dr. Dean Godwin presiding

Anomalies of accommodation

Dr. Hugo Kiefer gave a brief review of the theories of accommodation and the mechanism of accommodation in some of the lower animals. It was mentioned that some birds had a range of forty diopters. He then presented several case reports amongst which the following could be cited as examples. A man 74 years of age could read Jaeger 1 print with his distance correction. Another man 67 years of age required only a + 1.00 D. sphere addition for reading. A patient 36 years of age required a + 2.00 D. sphere addition for reading in each eye. The latter case was designated as one of premature presbyopia occurring in a myopic individual. The lack of necessity for full reading addition in the older individuals was explained as due to an abnormal softness of the lens for the age of the individual, or an inordinate amount of power in the ciliary muscle. Dr. Kiefer also remarked that he used cycloplegics in over 75 percent of his cases of refraction where the patient was over 45 years of age. He had never had glaucoma occur following the use of a cycloplegic.

Discussion. Dr. M. F. Weymann asked Dr. Kiefer if in the case of aged individuals he did not believe that the variations in accommodative power might be due to unhomogeneous sclerosis of the lens as occurred in incipient cataract rather than anomalies of the accommodative apparatus itself.

Dr. Clyde Harner inquired if Dr. Kiefer used eserin following cycloplegia. He himself had a 33-year-old patient who required a one diopter addition for reading.

Dr. Brandenburg mentioned the increase in astigmatism against the rule in older individuals.

Dr. John Osburn had seen cases of acute glaucoma after use of cycloplegia in older individuals and thought that cycloplegics should be used with caution in these cases.

Dr. S. V. Abraham in a series of questionnaire statistics found one case of glaucoma occurring in 18,000 where cycloplegics were used which were not followed by miotics, and one case in 22,000 where miotics were used following the cycloplegia. He thought that the principal cause of the increased tension was not the mydriasis, but the change in capillary permeability. One patient of his required less addition for reading after an attack of acute glaucoma.

Dr. Walter Crane thought that no loss of accommodation between the ages of 45 and 60 years was common. He inquired what results could be obtained by exercise for accommodation.

Dr. Kiefer concluded by stating that he used eserin on two successive days following each cycloplegic refraction. He thought that unequal sclerosis of the lens in the two eyes might account for differences of accommodation in the two eyes. In patients with over five diopters of myopia, except in children, an addition for reading was prescribed. Some people retained accommodation up to 70 years of age. Exercise had been found 95 percent useless, especially in accommodative defects.

Multiple melanoma of the conjunctiva

Dr. John N. Osburn defined tumors known as melanomata and gave a description of the different theories regarding their nature and origin including that of Masson, who believed that nevi and melanomata were derived from the cutaneous sensory nerve-end apparatus. In the eye melanomata were most frequently found in the choroid. In a patient 45 years of age seen by Dr. Osburn, a brown flat oval mass was located in the conjunctiva under the upper lid near the inner angle and not touching the limbus. It was growing rather rapidly and had been noticed for four months. After its removal by dissection the pathological report proved it to be a melanoma. There was no evidence of intraocular involvement. Fifty-two months later the same patient returned with a tumor the size of a small

almond growing from the lower cul-de-sac at the outer angle. It was attached by a flat pedunculated base. This growth was removed with a cautery and was also diagnosed as a typical melanoma by the pathologist. There had been no recurrence and no intraocular involvement. Dr. Osburn thought the second tumor to be coincidental rather than secondary to the first growth, because of the wide separation in sites of appearance.

Ocular myopathies and intraorbital tumors

Dr. Howard C. Naffziger, professor of surgery of the University of California Medical School, by invitation, presented his experience in the surgical relief of progressive exophthalmos. In certain cases of exophthalmic goitre, after thyroidectomy had been performed the exophthalmos progressively increased and lead to ultimate loss of the eye in spite of all treatment. Increase of retrobulbar fat and edema, sympathetic over-stimulation, lymphatic stasis, retrobulbar venous engorgement, varicose ophthalmic veins, dilated orbital arteries, weakening of the extraocular muscles, the widened fissure of exophthalmic goitre, and organic lesions of the restiform bodies had all been used as explanation for this type of exophthalmos. Amongst the unsuccessful maneuvers to combat this condition might be mentioned the Krönlein operation, cervical sympathectomy, and tarsorraphy. As a last desperate means of saving the eye in such a case of exophthalmos Dr. Naffziger opened the roof of the orbit after obtaining entrance to the cranium by turning down two bone flaps. A marked increase in bulk of the orbital content was noticed, mainly due to an enlargement of the extraocular muscles, which forced the globe forward. The thickness of the superior rectus muscle in the first case was more than one centimeter. Sections from such muscles showed in the early cases a separation of the fibers due to edema, which was followed by round-cell infiltration and later fibrosis of the muscle tissue. Up to the present time seven cases of this type of exophthalmos had been operated on with relief. In all cases the ocular muscles were enlarged from three to ten times their normal size. In the first cases the optic foramen was unroofed as well as the orbit, but in later cases it was found necessary only to decompress the roof of the orbit. In this way the contents herniated upward and allowed the globes to recede to a position where they could be covered by the lids. This operative procedure was also suggested as a route for the removal and examination of otherwise inaccessible orbital tumors.

M. F. Weymann,
Recorder.

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NATIONALISM AGAINST SCIENCE

A man who gained standing because he fought in the ranks of the German army in the world war, and the old man who commanded that army, after spending a life time in studying military strategy, can hardly be expected to appreciate the difficulties or value of modern science. But it was on the advances of science that Germany rose to the position where its leaders could dream that they were supermen. Even rampant nationalism might pause to consider the services that science has rendered and may still render to it.

Science is international, and today neither racial pride nor patriotism can achieve, or hold dominance for a nation without it. Under the heading "Academic Freedom" the London Lancet (October 7) points out the benefit even to England and its universities, of the recognition of scientific research and teaching in German universities, one hundred years ago. This had been brought about by the influence of Humboldt, who had chosen to live in the scientific atmosphere of Paris, before he was recalled to Germany to render his great service of making a place for science in the university curriculum.

The greatest German scientist of the last century was Helmholtz, whose mother was a direct descendant of William Penn, whose pacifist books would be burned in Berlin. Penn's mother belonged to a family that came to England from Holland. Germany in 1933 of the Christian era might well pause, before casting out Einstein and all of his race. Thirty years ago Hirschberg was the most famous teacher of ophthalmology in Berlin and drew students from other parts of the world. But because of his race he could not be Professor in the University of Berlin. Under less able teachers the prestige of Graefe was lost, and Vienna became the leading center of instruction in ophthalmology. Science requires loyalty to truth and freedom to teach it; without interference from supposed national, or racial interests.

The time has gone by when nationalism can be allowed to hinder, or cripple medical research or teaching. "No science has been more hampered by ignorance or

prejudice than that of medicine." Other countries may well help, and find place for the one thousand men and women who have been deprived of their hope for position in teaching and research, by racial prejudice and political near-sightedness. Germany led in ophthalmology, and gained great prestige thereby. But today other teaching centers in Europe, America, Asia and Africa are prepared to contend for that leadership. Germany can ill afford to turn from modern science to narrow racial prejudices that developed before science had established its international character and importance.

Edward Jackson.

ANTONIO SCARPA— A GREAT OPHTHALMOLOGIST

To those of the present generation the advances in medicine and surgery are taken as a matter of course. It is forgotten, sometimes, that the perfected measures which are now taught to our students were the acquisition of years of laborious and patient effort on the part of those who came before. The attainments of today would be quite impossible were it not for the study, the research and the clinical observations of the great surgeons of the past. Each generation starts with the scientific accumulations of the one that preceded it. It is worth while, therefore, to look back from time to time over the work of the great leaders of the past who were the road-makers and the torch-bearers of those who were to follow. Foremost among these was Antonio Scarpa whose contributions were of fundamental importance not only because of their originality and their clinical and operative value but to an equal degree because of their invaluable additions to our knowledge of anatomy and pathology.

Born in Italy in 1752 he lived through three decades of the nineteenth century and his greatest work "Saggio di Osservazioni e di Esperienze sulle Principali Mallattie degli occhi," although only one of a long list of his published works, went through at least four editions and was for many years a high authority in most of the European universities. His careful observations, his lucid style and his practical application of the then known pathology led Hirschberg to conclude that never before and perhaps never since, had a work of such originality based upon such conscientious and scrupulously a c c u r a t e observations been given to the world.

In a charming address Professor Scalinci* reviews the labors of Scarpa in the field of ophthalmology and in doing so covers much of historic ophthalmology. It is from this paper that many of the following points of ophthalmic interest were gathered.

Scientific surgery took its origin in Italy, whence it passed on to France, and soon afterwards throughout the civilized world.

Exact anatomy based upon dissection of the human body dates only from the time of Vesalius. The surgeon in the eighteenth century must find his way in many unknown regions. The name of Scarpa is chiefly remembered by his contributions to anatomy. His name is recalled in connection with an area in the femoral region, with a secondary tissue in the tympanum and two small foramina allowing the passage of the palatine nerves. The minuteness of these discoveries show the skill and accuracy of his dissections.

The magnum opus which made him immortal, referred to above, was entitled "Knowledge from observation and experience on the principal diseases of the eye." This work, together with his clinical teaching, for he had many pupils who later themselves became famous, was the foundation on which Fischer and Richter and Beer erected the superstructure subsequently built upon by Arlt, the Jaegers, father and son, and Arlt's great pupil von Graefe who with his friends Donders and Bowman were to give to the world the golden age of ophthalmology. Scarpa was breaking new ground. It was the irony of fate that his name should be associated with a condition which he had never actually seen, staphyloma

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* "I Meriti di Antonio Scarpa nel campa della Oftalmologia," Annali di Ottalmologia e Clinica Oculista, Prof. Noe Scalinci, September, 1933.

posticum. In this he was like his master Morgagni, founder of the School of Ophthalmology of Pavia, whose renown is linked with a liquid that is non-existent and with a form of cataract to him unknown.

Scarpa's greatest fame was as a surgeon. The anatomy of the lachrimal passages had been known before his time from the studies of Carpi, Vesalius, Fallopius, Morgagni and others but no clear understanding was had of the cause or rational method of treatment for the condition known as fistula lachrimalis, which included all lachrimal disturbances.

It was Scarpa who recognized as the etiology of dacriocystic inflammation the retention of the fluids in the sac, dependent upon stenosis of the nasolachrimal passage and devised methods by which the closed channel might be made clear. The French surgeon, Anel (1712), had indeed used irrigation of the sac by means of the finely pointed syringe to which his name is still given but without effecting a cure because of the obstruction of the duct. Petit had pointed out two years later that Anel's irrigation was of use only in incipient cases. He incised the swollen sac and introduced a canallated stylus.

Scarpa gave an exact description of chalazion and advocated its removal usually from the conjunctival side, except when it was in an inaccessible position, which is good practice today.

He enriched the literature on blepharoplasty, anticipating by nearly a century, with the exception of the work of von Graefe, the classical operative procedures of Pagenstecher and de Wecker.

The practicability of operative procedures in strabismus had not yet been recognized although Taylor had indicated their possibility. It was not until 1839 that Dieffenbach tenotomized the muscle but the results were so disastrous that the operation fell into disrepute until it was revived and placed upon a scientific basis by von Graefe. Scarpa gave a masterly description of the removal of a cyst of the orbit and two cases of pulsating sanguinous tumors (aneurisms), one by Travers and one by Dalrymple successfully controlled by ligation of the carotid.

His operative work on the bulbus included paracentesis for hypopion and opening of the ball for infantile glaucoma and for corneal staphyloma. His most important surgical procedures were, however, for cataract and artificial pupil. Others had proposed this latter operation and had even removed a portion of the iris which had been detached in the operation for cataract.

Scarpa described in detail in the fourth edition of this book the way in which the iris tissue could be removed to its base.

It was this initial work that made Graefe's classical iridectomy for glaucoma and for other conditions possible. Shortly after Daviel had published his invaluable contribution for the extraction of cataract, it was improved upon by La Faye and soon adopted by most of the great French surgeons but as asepsis and local anesthesia were unknown and exceptional skill was required for this new and seemingly hazardous operation Scarpa, contrary to his usual habit, did not accept the new extraction method. Skillfully performed depression seemed safer and he was a great operator. In this he was out of harmony with the surgeons of his age. Richter had already as early as 1776 shown the desirability of extraction of the lens in capsule, and Beer had actually devised and performed the operation but over a century and a quarter was to elapse before it became at all generally employed.

Keratoconus had been recognized as early as 1736 by Duddan and later described by Taylor and Ware who characterized it as the sugar-loaf cornea. Scarpa thought it a form of staphyloma and noted the bright reflex from the tip of the cone.

Many early observers had advanced the theory that myopia was due to an elongation of the globe. Scarpa described the ectasia which was demonstrated by Arlt and a few years later when Helmholtz had given to ophthalmology the ophthalmoscope the changes in the fundus were made visible. It was Edward Jaeger who in

honor of the earlier observer designated the condition as Staphyloma verum Scarpae.

Limits of space prevent a more extensive outline of the work of this great surgeon but it was a work so fundamentally sound and scientific as to make a firm and sure basis for the future up-building of the science and art of ophthalmology. Park Lewis.

NATIONAL SOCIETY FOR PREVENTION OF BLINDNESS

In the very interesting Seventh Annual Report of the Giza Memorial Ophthalmic Hospital, reviewed in this issue, one of the most striking statements is that in the towns of Egypt one hundred percent of the native children have acquired trachoma by the time they are one year old. Appalling beyond description! Knowing the practically inevitable course of this scourge one can readily agree with the director of the Hospital, Rowland P. Wilson, that the hope for the eyes of these people lies in prevention.

In wealthier countries, prevention of eye diseases does not have the importance that it does in Egypt but in ophthalmology, as in all medicine, prevention will assume an increasingly prominent part in the future.

Many states have passed compensation laws to aid, among others, the ocularly injured and have authorized pensions for the blind. Soon after the passage of these laws the state executives began to realize the tremendous cost of the care of these people and the vast economic waste entailed. Industry has long realized this and has been trying for years to protect its workers. More recently tax payers have begun to count the cost and have become interested in cutting down this expense. The answer is obviously, prevention.

Fortunately some nineteen years ago there came into being through contributions from the Russell Sage Foundation and the Rockefeller Foundation, the National Committee for the Prevention of Blindness, later called the National Society for the Prevention of Blindness. To this national body it has been possible for ophthalmologists, state committees, social agencies, local societies for the blind and all interested parties to turn for aid and advice.

The Society has in its program preventing of infantile blindness, care of the eyes of preschool children, prevention of accidents to the eyes in childhood, conserving the sight of school children, conserving the sight of the worker, publishing and distributing material, research and demonstration projects. In each of these fields it has been very active and much has been accomplished. The Society has been fortunate in having an unusually able Board which is closely in touch with the prevention work in each state and is constantly being of service. One of the recent interesting projects has been the training of social workers for ophthalmological purposes. Selected individuals have been placed for instruction in universities which have active social service and ophthalmological departments. After finishing their training these students have been located in hospitals and clinics that need such workers. The Society's quarterly, the "Sight-Saving Review" and "Sight-Saving Class Exchange" for teachers and supervisors of sight-saving classes are well prepared and instructive journals. Work on prophylaxis of ophthalmia neonatorum has been active for a long time. Encouragement of sight-saving classes, and statistical enumeration of them has been a part of its task.

The Society is constantly looking forward, being ever willing to enter new fields of usefulness. Under consideration now is the advisability of giving instruction to workers to aid in the orthoptic clinics. The Society is endeavoring to discover if this is a suitable undertaking for it. The answer will depend on the reaction of the ophthalmologists of the country to the questionnaire sent out by the Society but the suggestion is cited as an example of the willingness to go forward.

The National Society is to be congratulated on what it has already accomplished and encouraged to go on with the good work. Whoever is inter-

ested in work in ophthalmic prevention or needs help in such matters, would do very well indeed to consult with this organization.

Lawrence T. Post.

IMPROVED FORM OF SLITLAMP MICROSCOPE

The popularity and general employment of any piece of medical apparatus depend upon several factors: first, knowledge of its existence; second, understanding of its purposes and advantages; third, the facility with which it can be used from day to day by the average worker; and, lastly, its cost.

There are today few ophthalmologists who do not know of the existence of the slitlamp microscope, but many who have a limited understanding of its purposes and advantages. The cost of the more elaborate slitlamp microscopes to which the name is properly restricted leaves much to be desired. But many perhaps have also avoided the apparatus because it appeared to be complicated and unwieldy.

The mechanical objections to the slitlamp apparatus most widely used are clearly enumerated by Comberg (Klinische Monatsblätter für Augenheilkunde, 1933, volume 91, page 577), director of the University Eye Clinic at Rostock, Germany. Especially inconvenient is the need for detailed readjustment of the light source in going from one eye to the other, with the incidental swinging of the long bar of the slitlamp carrier across the body of the examiner.

The second difficulty consists in the necessity for repeated and separate adjustment of the microscope and the slitlamp for the purpose of studying different parts of the eye, a necessity which employs both hands of the examiner. Changes in intensity of illumination and in width of the slit call for disturbing changes in the position of the examiner and in the direction of his gaze, and are usually complicated by disturbance in adjustment of the image of the slit.

In the radically modified form of the slitlamp microscope devised by Comberg,* these inconveniences have been avoided and other material improvements have been introduced. The original model of this apparatus has been in use by Comberg for over three years, and was briefly demonstrated at the International Congress in Madrid.

Both the microscope and the lamp revolve upon the post which supports the patient's chin and forehead. The whole apparatus becomes very much more compact. The troublesome long arm carrying the slitlamp in the old apparatus is replaced by a very short arm, the beam of light being at first directed vertically and then turned horizontally by means of a prism.

While the slitlamp image is being adjusted in relation to the patient's eye, the microscope is swung to one side. Once the patient's head is set at the proper height, either eye is brought into the necessary relationship with the microscope and lamp by means of a screw which displaces the head an inch or so to one side or the other. This, in combination with the up and down action of the head rest, and with a much longer image of the luminous slit (eight millimeters) enables the observer to vary the position of the "object" (the patient's eye) almost as conveniently as one varies the position of the object beneath an ordinary microscope.

Some of the arrangements included in this new apparatus are so obviously superior to those of the old slitlamp microscope that one wonders why they were not long ago incorporated in this increasingly important weapon of ophthalmologic diagnosis. But it is common experience that new devices appear simple and obvious when once the brain of the inventor has given birth to them. It is to be hoped that some day the manufacturer will see his way to produce an apparatus at much less than the present cost. In so doing it is not at all unlikely that he would actually increase his own profits by a great addition to the number of buyers.

W. H. Crisp.

* In collaboration with the firm of Carl Zeiss.

IRIDENCLEISIS—A CORRECTION

Dr. Luther C. Peter calls attention to an inaccuracy in the editorial which appeared in our December issue under the title of "Objections to iridencleisis." The remark attributed to Dr. Peter, "that the surgical principle involved is basically contrary to the teaching of a century" had actually been quoted by Dr. Peter as having been made by another surgeon. Although Dr. Peter said that this remark had expressed his own attitude toward the operation for a number of years, these comments were taken from a paper read by Dr. Peter before the Pacific Coast Oto-Ophthalmological Society as far back as 1928. In preparing the editorial, the antiquity of these comments was overlooked. Dr. Peter writes that he has now a record of several hundred cases in which he has performed the operation of iridencleisis, and that he regards it as of value in cases in which the tension is not very high, but as less efficacious than the trephining operation, one of the chief objections being that iridencleisis enlarges the pupil.

The writer regrets that Dr. Peter's attitude was inadvertently misrepresented. W. H. Crisp.

BOOK NOTICES

Det Norske Medicinske Selskab, 1833-1933 (The Norwegian Medical Society, 1833 to 1933), volume commemorative of the Society's hundred-year jubilee. By Fredrik Grøn. Stiff paper covers, large octavo, 265 pages, freely illustrated. Price not stated. Steenske Boktrykkeri Johannes Bjørnstad A/S, Oslo, 1933.

This handsome volume should serve as an excellent review of Norway's medical history during the past one hundred years. It contains a brief chapter of remarks on medical conditions within and outside of Norway in the seventeenth and eighteenth centuries. Three other introductory chapters deal with the national university and its medical faculty, the earlier Norwegian medical journals, the cholera epidemic of 1830, and the circumstances surrounding the foundation of the Christiania Medical Association in 1833. The famous Norwegian medical journal, "Norsk Magazin for Laegevidenskaben," was founded in the same year.

The volume is largely composed of memoranda concerning the lives of prominent Norwegian physicians, and of the activities of its medical organizations. Many excellent portraits and group photographs are reproduced.

W. H. Crisp.

Koors glaznikh bolyeznei (Text-book of diseases of the eye). By A. A. Kryukov and V. P. Odintzov. 515 pages. Illustrated. 13th edition revised (3rd edition of oguiz). Moscow-Leningrad, 1931.

The first edition of Kryukov's classic text-book of ophthalmology appeared some 50 years ago, and not less than 9 editions have appeared since the author's death in 1909. Almost two generations of Russian students of ophthalmology have been brought up on this standard text-book. The later editions have been revised by Odintzov, and its popularity seems undiminished. The preceding 12th edition was exhausted in one year, and the present edition is of 10,000. There are many illustrations and only 4 colored fundus pictures, which suffer in quality because of the poor paper. For a text-book intended for the student and general practitioner the chapters dealing with ophthalmoscopy, refraction, physiologic optics and neurology of the eye are disproportionately inadequate as compared with the large amount of space devoted to surgery of the eye, with all allowance made for the prevalence of trachoma and consequent lid deformities. The slitlamp is illustrated and referred to "as an instrument too costly and complicated, and only available to large institutions." Occupational diseases receive more attention than they do in our text-books, and special paragraphs are devoted to those of the cornea and conjunctiva, among millers,

woodworkers, workers in wool, coal, artificial silk, metal workers (corneal anesthesia), stonecutters, chemicals (discolorations). Military ophthalmology is endowed with a whole chapter for a consideration of poison gases, tear gases and suffocating gases, with the apology that "the Soviet government is peace-loving but war is inevitable and gas warfare will play an important role." M. Davidson.

Mayou's diseases of the eye. Revised and largely rewritten by Frederick Ridley and Arnold Sorsby. Fourth edition. 249 pages, numerous illustrations. Oxford University Press, London: Humphrey Milford, 1933. Price $2.25.

This is an excellent text and reference book for the ophthalmological student. It covers the most important ophthalmological subjects in a comprehensive manner and will be a useful book in any ophthalmologist's library. Because of its condensed form and small size, being only 6½ by 4½ inches, it can be readily carried by the student. There are thirty-eight figures in black and white which are very helpful in portraying some less readily comprehensible points. The print is clear and sufficiently large to render reading easy. Lawrence T. Post.

Giza Memorial Ophthalmic Laboratory. 7th Annual Report. Paper covers. 140 pages. Numerous illustrations, several colored. Schindler's Press, Cairo, Egypt, 1932.

The first part of the book is devoted to the discussion of the various departments, staff, equipment, library, graduate instruction and so forth. The department of pathology examined 472 specimens during the year; indicative of a very active service. Seventeen especially interesting cases with clinical reports are given. Eight unusual clinical cases are described with excellent illustrations, three of them colored. The last half of the report is devoted to the Research Section; Trachoma occupying the major portion. Exceedingly interesting experiments on prophylaxis for trachoma were carried out. In most villages in Egypt 100 percent of the native population is affected before the end of the first year. Ten newborn children were treated after several accepted methods, only one of which, namely, the instillation of the so-called "blue drops" used by the government ophthalmic hospitals and composed of 0.5 percent zinc sulphate with 0.01 percent mercury pyoctannate, was successful. Of five cases treated with "blue drops," four were still uninfected after nine months.

Treatment with chaulmoogra oil and copper sulphate again proved its value in tests. Antimony compounds and vaccine therapy were useless.

The Shahan thermaphore apparently has an excellent effect on thinning out a thick pannus which is replaced by fine delicate nebulae with usually considerable improvement in visual acuity. This method was originally reported by Dr. Higbee and by Dr. Hardy several years ago.

Bitot's xerotic patches were successfully treated with phenol, by Dr. Tobgy. One application was generally sufficient for a cure.

Major F. H. Stewart reported on the "Prowazek-Halberstaedter bodies." Major Stewart was unable to find these bodies in a single case of uncomplicated trachoma. The suggestion is made that they are the products of secondary infection. Five plates accompany this contribution. Lawrence T. Post.

CORRESPONDENCE

December 29, 1933

Dear Dr. Post:

In reference to the article entitled "Detachment of the retina—its present operative treatment," by Dr. Pischel, appearing in the American Journal of Ophthalmology for December, 1933 it will be of interest to note that we at the Manhattan Eye, Ear and Throat Hospital have simplified the technique for inserting the pins into the sclera. We insert each pin with its protective guard or collar into an opening at the

end of a pen-shaped handle just as one would insert a pen point into a pen holder. On the handle is a small button on which pressure is made with the index finger thus "making" the current and holding the pin firmly in place. The pin point is then placed on the sclera with gentle pressure and allowed to perforate to the guard. The finger is then removed from the button thus "breaking" the current and allowing the handle to be removed from the pin, the latter remaining in place in the sclera. This method makes it extremely simple to insert each individual pin into the sclera. For the large brush-like electrode the same technique is used inserting one end of the electrode into the handle through which the current passes.

Very truly yours,
J. Levine.

(Ed.: This is very similar to the method of Walker; Amer. Jour. Ophth., v. 17, no. 1, p. 1.)

January 4, 1934.

Dear Dr. Post:

Apropos of Dr. E. V. L. Brown's letter in the January issue on Dr. Hoffman's article on "Medical Economics" I feel that while his comparison of the medical profession to the teaching profession is apt, it is not sufficiently comprehensive.

If we think of what is happening to the medical profession in terms of what has happened to the clergy and the engineering professions we probably get a better insight into what is likely to happen to us in the future. The loss of prestige and economic security by the clergy certainly began with Martin Luther and has become more pronounced with each succeeding schism. Volumes have been written to prove this was bad, or good, for the souls of the customers, but it was obviously bad for the clergy, at least on the material plane.

When our predecessors took the element of mystery out of their art, began to practice scientific medicine and speak and write in the vernacular, the beginning of the end was at hand—economically.

When the young engineer is graduated from engineering school today, does he hang out his shingle and begin to practice engineering tomorrow? By no means. If he is lucky he goes to work on a very small salary for the telephone company or some other gigantic corporation which can use his knowledge. Unless he is far above the average he remains on the small salary indefinitely. If he is unlucky he is likely to find himself confronted day after day by the monotonous physical principles embodied in a hand gasoline pump.

I venture to predict that the history of the medical profession will be roughly parallel to the history of engineering and that in a few more generations, the average doctor's place in the community will be less desirable than the average teacher's.

Of course, "there is always room at the top" but it is going to be a hard climb, mates!

Very truly yours,
George N. Hosford, M.D.

January 8, 1934.

Dear Dr. Post:

Apropos of Wm. H. Crisp's editorial relative to the iridencleisis operation for glaucoma, I want to offer a correction and express my pleasure that this procedure is at last receiving the recognition it so well deserves. Neither Borthen nor Holth originated this operation; it was first devised and performed by Critchett in 1857 (Fuchs' Text book, 7th edition, p. 912). This operation at that time was created by necessity following the failures of the iridectomy and sclerotomy operations then in vogue. The Holth iridencleisis operation was a modification of the revival of Borthen of the Critchett procedure, the Holth technique which has again been recently altered so as to conform more closely to the original procedure, namely, prolapse of iris tissue into a limbal wound. The name more intimately associated with the original operation is that of Borthen who has used this method for about 35

years. However, in a personal communication to the undersigned several years ago, Borthen attributed the favorable results following this operation to a broadening of the so-called normal avenues of fluid escape, namely, the spaces of Fontanna and the canal of Schlemm and performed some interesting experiments to maintain his position.

This writer who has used the iris prolapse operation with some modifications for over 15 years in several hundred cases, has come to one definite conclusion, that is, that all operations so far devised for the purpose of extraocular drainage have the same basic principal, namely, drainage into the subconjunctival spaces by fistulization. Whether one removes an elliptical wedge of sclera as in the LaGrange or Herbert operation or removes a round section of sclera as in the Elliot or Fergus procedure, is not material, the unfortunate part is that they all tend to close by the formation of connective tissue and thus defeat the primary purpose. Therefore the essential phase of the question which remains to be answered is, which method of decompression or fistualization operation presents the more positive method for maintaining this extraocular drainage over a longer period. The sclerectomy methods of LaGrange, Herbert, Elliot and Fergus are essentially the same, depending on an opening and a prayer that the hole in the sclera or cornea-sclera will not close. The methods of Critchett, Borthen, Zorab and recently Holth depend on an incision at the limbus with the interposition of a tissue or foreign substance that will act as a seton to keep the lips of the wound separated and thus maintain extraocular drainage.

The indications and arguments favoring the sclerectomy operation are many, but we find the LaGrange operation rarely done in this country today, the Herbert and Fergus operations almost unknown and the Elliot operation not as popular as in the past. Those favoring the sclerotomy type with the interposition of some material to keep the lips of the wound apart would seem to be gradually drifting to the original technic created by Critchett. The use of a foreign substance between the lips of the wound as suggested by Zorab and others is rarely practiced any more, the procedure of Holth has undergone radical modification so that it no longer materially differs from the procedures of Critchett or Borthen in its primary principle namely, the interposition of some iris tissue between the lips of the cornea-scleral incision.

As to the so-called unsurgical principal involved in the incarceration of the iris, this writer feels that it is about time that this fetish be dismissed, as no evidence has been presented to warrant such attitude as borne out by clinical experience over a very long period. That we do have an occasional irido-cyclitis following is not disputed, but this is due to faulty manipulation and is of no greater frequency than in any other iris operation. In some cases after the most perfect manipulation and for no demonstrable reason an irido-cyclitis is precipitated, but we know that some irides simply cannot tolerate handling. It may be definitely stated that this operation is more easily performed, therefore the iris is less subjected to trauma.

As to post-operative infection, I do not recall one such case in both my private or clinical practice although they have been reported. Hemorrhage does occur, but certainly no more frequently than after any other operation which reduces the intraocular pressure rapidly, I should say less frequently.

Closure of the wound does take place by the formation of connective tissue, but this too may be materially diminished by the avoidance of trauma in the making of the conjunctival flap. The very little postoperative attention necessary following this operation is probably its greatest attraction. Atropine sulphate alone should be used directly after operation and until all the symptoms have disappeared. I have rarely had to resort to pilocarpine locally, but internally or subcutaneously it is of some value where the tension tends to remain a little high. It is the one operation that will permit a patient to

return to his home without fear of an acute rise of intraocular pressure that will require attention.

We must always bear in mind whatever operation we use, that we have not removed the cause, but only created a state or an accessory avenue for fluid escape. Recurrence of the factors that precipitate the symptoms we call glaucoma does occur; the manifestation of these symptoms will depend on the severity of these factors and the efficacy or permanency of our surgical procedure. This in my opinion is the most important factor in the study and care of the glaucomatous eye. Therefore, the operation which will maintain this accessory avenue of fluid escape over a longer period must be the operation of choice, regardless of our personal reaction to a surgical principle. Microscopic slides are now available to show that this fistulous tract becomes lined with epithelium after the iris is incarcerated.

Very truly yours,
Michael Goldenburg.

January 22, 1934

Editor
American Journal of Ophthalmology
Metropolitan Building
St. Louis, Missouri

Dear Sir:

In my discussion of Dr. Tooker's paper on "Epithelial Cyst" (Journal for January 1934) there is an error in the middle of the first column on page 47. No doubt I am responsible for this error but at any rate I would like to call attention to it. The report reads as follows: "A diagnosis of melanotic sarcoma was made and enucleation advised." This should read: "A diagnosis of melanotic sarcoma had been made elsewhere and enucleation advised." It is evident from the reading of my description of the eye that I was under the impression that we had to deal with a cyst and not a solid tumor and the operation was undertaken with that idea.

Very respectfully,
E. C. Ellett.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy and embryology

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1. GENERAL METHODS OF DIAGNOSIS

Accardi, A. **The threshold of light perception under normal and pathological conditions and under the action of certain drugs.** Ann. di Ottal., 1933, v. 61, Aug., p. 561.

Measurements of the threshold of light excitation were made in a large number of normal subjects from all social classes. In general, light perception limits did not appear to be affected by refractive conditions. The sensibility was markedly increased by atropinization, while under pilocarpin miosis the opposite was true. This was probably primarily due to the pupillary differences. There was no way of determining the effects of the medicaments on the cellular retinal elements as to their light receptive qualities. Light perception was notably disturbed by adrenalin, and similar effects were found in the arteriosclerotic. In postneuritic optic atrophy the threshold was often affected but not always proportionately to the diminished visual acuity. The Nagel method was employed in making the tests. (Bibliography.)

Park Lewis.

Archangelskii, B. **Rapid celloidin method of imbedding whole eyes.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 414.

This is a detailed description of the method of rapid hot celloidin imbedding of whole eyes, as given by F. Fralick and Mary Fralick (American Journal of Ophthalmology, 1931, volume 14, page 1042).

Ray K. Daily.

Bercovitz, Z. **The pupillary test for the diagnosis of pregnancy.** Amer. Jour. of Obstet. and Gynecol., 1933, v. 25, June, p. 882.

In a previous report, the author demonstrated that the freshly obtained serum of a pregnant woman instilled into her own conjunctival sac would cause an alteration in the size of the pupil. As the test is described in this article whole blood is substituted for the serum. There may be either dilation or contraction of the pupil. The other eye is used for comparison and control. Of 382 patients tested, 154 were not pregnant, and none of these showed a positive pupillary reaction. In the remaining 183 patients the diagnosis of pregnancy was confirmed later, and, of these, 155 or 85.7 percent showed positive pupillary reactions.

M. E. Marcove

Dean, A. M. **Visual field changes; a three dimensional model for demonstration purposes.** Jour. Iowa State Med. Soc., 1933, v. 23, May, p. 268.

The author has made clay models of visual fields, based on the graph that Traquair constructed to explain quantitative perimetry. The models are calculated from the isopters made by various-sized white test objects. Four models are shown together with their visual fields. (Discussion.)

M. E. Marcove

Dekking, H. M. **Infrared photography of the eye.** Graefe's Arch., 1933, v. 130, p. 373.

In two cases of cloudy cornea, one of parenchymatous keratitis and the other of disciform keratitis, photographs with an infrared filter showed clear cornea and definite details of the iris. In the case of disciform keratitis, the author presents the photographed illustration without and with a Wratten infrared filter. H. D. Lamb.

Feldman, J. B. **An improved illuminator and pupillometer.** Arch. of Ophth., 1933, v. 9, June, pp. 974-976.

The apparatus utilizes the Weston photronic cell. The instrument is cheap to construct and very reliable.

M. H. Post.

Halbron. Pierre. **Clinical perimetry.** Ann. d'Ocul., 1933, v. 170, Oct., pp. 817-845.

Although the author does not discredit the accurate procedures of Ferree and Rand he claims that simpler steps are satisfactory in ordinary clinic routine. A gray perimeter, properly illuminated, should be used. For peripheral fields he advises a white test object 3 mm. in diameter. The target should be carried in from the periphery. Central fields are best studied on the perimeter also, using a 1.5 mm. white target, but for this purpose the target should be moved outward from the center of the scotoma. H. Rommel Hildreth.

Harman, N. B. **A hand slitlamp.** Brit. Jour. Ophth., 1933, v. 17, Sept., p. 552.

This lamp is designed for portable qualities in bedside work. The source of the light is from the battery handle of an electric ophthalmoscope. (Illustrated.) D. F. Harbridge.

Heath, Parker. **Ocular histiocytosis and allied phenomena.** Trans. Amer. Acad. Ophth. and Otolaryng., 1932, 37th annual meeting, p. 121. (See Amer. Jour. Ophth., 1933, v. 16, Dec. p. 1117.)

Hertel, E. **X-ray studies of various structures of the eye.** Arch. f. Augenh., 1933, v. 107, Aug., p. 259-294.

This is a detailed technical study.

Frederick C. Cordes.

Homma, R. **Experimental findings on the complement fixation reaction of the aqueous in so-called active tuberculosis.** Graefe's Arch., 1933, v. 130, p. 501.

A suspension of human tubercle bacilli 0.5 to 1 c.c. was introduced intravenously or intracardially, into the lung or testicle of twenty-seven rabbits. In fourteen animals the eyes remained entirely free from tuberculous involvement, although in thirteen of these the complement fixation reaction for tuberculosis was ++ with blood-serum in dilutions up to 1 to 20, and in two of the latter it was +++ with blood-serum in dilutions up to 1 to 40 and + with aqueous humor in dilutions up to 1 to 20. In a second group of six rabbits choroiditis appeared on an average after two weeks and iridocyclitis on an average after three weeks from injection of the tubercle bacilli. But in none of these six animals did the aqueous humor show any positive reaction to the complement fixation test, and the blood serum reacted only faintly in three animals. A third group of ten rabbits showed extensive tuberculous choroiditis without involvement of the anterior part of the eye, at an interval of eighteen to thirty days after the date of injection. When the bacilli were injected intracardially, the inflammatory changes tended to become more severe than when the injection was intravenous. H. D. Lamb.

Horner, W. D. **The selection of a reliable, safe mydriatic for fundus examination.** United States Naval Med. Bull., 1933, v. 31, July, pp. 276-281.

Horner lists the different mydriatics in order of preference for fundus work: (1) an ephedrin-homatropin mixture,

such as homatropin hydrochloride 0.01 gram, ephedrin hydrochloride 1 gram, and distilled water 10 grams, or the fifty percent weaker combination of Groenouw; (2) a cocaine-euphthalmin combination in equal parts as advocated by Jackson and Wood, using two percent solution; (3) eupthalmin alone in three to five percent solution; (4) ephedrin alone in from three to five percent solution; (5) homatropin alone in one percent solution; (6) cocaine solution one to two percent; and (7) concentrated epinephrin solution (in exceptional cases). In highly pigmented people, he particularly advocates the use of homatropin in combination or alone. (9 references.)

Ralph W. Danielson.

Lancaster, W. B. **The standard classified nomenclature of disease—illustrated by the classification of heterophoria and heterotropia.** Trans. Amer. Ophth. Soc., 1932, v. 30. p. 285.

The general plan of the volume on nomenclature is explained with a number of illustrative lists. The writer states that the list is incomplete, especially as regards the index, and he asks for cooperation and criticism with a view to rendering the first public edition of the volume more complete.

Lauber, Hans. **A projector for perimetry and campimetry.** Zeit. f. Augenh., 1933, v. 81 Oct., p. 299.

Lauber's projector is light enough to be easily manipulated, and the size of the projected mark and the color of the light may be easily changed. The brightness is so great that on a black perimeter diffusely illuminated the projected mark looks like a piece of white paper. F. Herbert Haessler.

Lijo Pavia, J. **A new campimetry arrangement free from error.** Rev. Oto-Neuro-Oft., 1932, v. 7, Nov., p. 474.

Best's method is described and illustrated. M. Davidson.

Lyle, D. J. **A stereoscopic fixation attachment for the perimeter.** Arch. of Ophth., 1933, v. 9, May, pp. 917-820.

A tubular attachment allows of binocular fixation in cases where the eye to be examined lacks central fixation. Through a tube the fellow eye fixates a second object placed on the end of the tube. The pupillary distance may be regulated. M. H. Post.

McAndrews, L. F. **Argyll Robertson pupil.** Arch. of Ophth., 1933, v. 10, Oct., pp. 520-534.

The reports in the literature indicate that a real Argyll Robertson pupil is always a sign of syphilis until proved otherwise. Something more than loss of the light reflex is necessary before accepting a case as one of Argyll Robertson pupil. There must be not only loss of direct and indirect light reaction, but increased and sustained convergence reaction, and the pupils should be less than 3 mm. in diameter and should not vary from time to time. The psychic and sensory pupil play must be lost or lessened. Theories as to location of the lesion are discussed.

M. H. Post.

Mackie, E. **A new slit-lamp.** Brit. Jour. Ophth., 1933, vol. 17, Sept., p. 554.

From this simplified apparatus many refinements of the more expensive instruments are omitted. The light source is a "home cinema projection lamp," used direct on the house current without resistance. The lamp and microscope are both mounted on bases to slide on the glass-topped table. The microscope affords a flat field and the magnification is x 20 which can be increased to x 28 by the addition of a 32 mm. objective. D. F. Harbridge.

Row, D. H. **Lens attachment for the ophthalmoscope.** Arch. of Ophth., 1933, v. 10, July, pp. 97-99.

The author describes an arrangement whereby ordinary test lenses may be fitted to the ophthalmoscope for use in examining cases of high refractive error. M. H. Post.

Sugita, Yozo. **The difference between the histochemical reaction in the corneal epithelial cell layer and in the cor-**

neal stroma, particularly metachromasia of the cornea from staining with methylene blue. Graefe's Arch., 1933, v. 130, p. 488.

In frozen sections from cattle or rabbit corneas stained for 1 to 2 minutes in 0.1 percent aqueous solution of methylene blue the lamellae of the stroma became violet-blue, the protoplasm of the anterior epithelial and posterior endothelial cells light blue, and the nuclei of the epithelial, endothelial, and fixed corneal cells dark blue. In a 0.1 percent aqueous solution of pyronin, the lamellae of the stroma took an orange color, while the nuclei of the epithelial, endothelial and fixed corneal cells as well as the protoplasm of the epithelial and endothelial cells stained red. The same color changes were observed with loupe or corneal microscope and slit-lamp after injecting or tattooing the methylene-blue solution into the corneal stroma and epithelial cell layer of the living rabbit. H. D. Lamb.

Traquair, H. M. **A symposium on the diagnosis of intracranial new-growths.** (Opening paper). Trans. Ophth. Soc. United Kingdom, 1931, v. 51, pp. 378-389.

Negative perimetric evidence is of no value unless there are data as to which tests were made and under what circumstances. Such evidence may be of value in proving that the tumor has not invaded certain areas. Positive evidence from perimetry will be of value inversely with the amount of evidence obtained in other ways. For instance, high intracranial pressure may concentrically narrow the fields and so interfere with their proper evaluation.

Thomas D. Allen.

Velhagen, K., Jr. **Recording the sympathetic reactions of the eye.** Arch. f. Augenh., 1933, v. 107, Aug., p. 483.

Velhagen describes a method of recording the blood pressure and intraocular tension on the same record. A photographic record is made by means of small mirrors mounted on levers and a reflected beam of light.

Frederick C. Cordes.

Vigdortschik, H. A. **A device for the determination of adjustment to absence of binocular vision.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 233.

A revolving block holding two rods of unequal thickness is attached to a revolving hexagonal disc, one side of which is screened and the other open. By placing the rods in various positions and at various distances from the patient, one can determine the patient's ability to judge projection on horizontal surfaces, to read perspective, and to recognize a change in the position of objects in space. This device is used for one-eyed people and for those with marked difference in the visual acuity of the two eyes. Ray K. Daily.

Weill, G. **Clinical results from interferometry in ophthalmology.** Ann. d'Ocul., 1933, v. 170, Nov., pp. 916-920.

This procedure was used in a variety of conditions, such as iridocyclitis, tumors, tuberculosis, lues, and endocrine disturbances. In extrapulmonary tuberculosis the method was sixty-five percent accurate; in lues seventeen percent. The procedure is subject to errors at different steps but is felt to be worthy of extended trial.

H. Rommel Hildreth.

Weill, G. **Interferometry in the diagnosis of iridocyclitis supposedly tuberculous in origin.** Ann. d'Ocul., 1933, v. 170, Nov., pp. 913-915.

Interferometry is a method of studying fluids based on certain light phenomena and is applied to blood sera that contain ferments specific to protein substances. Of thirty-four cases of iridocyclitis the procedure gave correct indications in seventy percent.

H. Rommel Hildreth.

2. THERAPEUTICS AND OPERATIONS

Allen, T. D. **Atropin solution given by mistake on prescription for pilocarpin.** Amer. Jour. Ophth., 1933, v. 16, Dec., pp. 1102-1103.

Cepero, G., and Comas, C. **Our electrodes for ophthalmic medical dia-**

thermy. Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, Jan.-Feb., p. 35.

The authors utilize the frame of goggles such as are used by electric welders, replacing the glass with a laminated lead disc to form the active electrode. Cotton wetted in 10 percent saline solution fills the space between the lead disc and the closed eye. The indifferent electrode should be on the back of the neck, just below the hairline. (Illustrated.) M. Davidson.

Cepero, G., and Comas, C. **Our technique in the use of ophthalmic medical diathermy.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, March-April, p. 105.

The technique of wiring in series so that as many as six patients can be treated simultaneously is described. Medical diathermy is recommended in a wide variety of eye conditions. (Illustrated.) M. Davidson.

Feig, J. **The use of roentgen rays in the treatment of tuberculous lesions of the anterior segment of the eye.** Klinika Oczna, 1933, v. 11, pt. 1, p. 34.

The author reports ten cases of various tuberculous lesions of sclera, cornea, and iris in which good results were obtained with x-radiation. Other therapeutic methods, including tuberculin treatment, had previously failed to give appreciable relief. The dose used in the author's cases was 60 percent erythema dose in three to four applications.
M. Beigelman.

Fradkin, M., and Levina, L. **Lysins and their possible application in ophthalmology.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 416.

The discussion of lysins is for the purpose of acquainting ophthalmologists with this new form of therapy which so far has not been tried in ophthalmology. Ray K. Daily.

Poliak, B. L. **Comparative disinfecting action of the most important disinfectants employed in ophthalmology and in surgery.** Graefe's Arch., 1933, v. 130, p. 256.

The author reports as to the effect on pneumococci of various dilutions of a wide variety of drugs. Virulent pneumococci of types 1, 2, and 4 were found to be killed by sublimate, oxycyanide of mercury, and optochin in dilutions of 1 to 1,000,000 or thereabout.
H. D. Lamb.

Theobald, G. D. **The use of calcium gluconate in diseases of the eye.** Amer. Jour. Ophth., 1933, v. 16, Nov., pp. 975-980.

Velhagen, K., Jr. **The basis of the ocular pharmacology and toxicology of Carbaminoylcholin (Lentin, Doryl).** Arch. f. Augenh., 1933, v. 107, Aug., p. 319-344.

Carbaminoylcholin (Lentin, Doryl) when put in the conjunctival sac acts as a miotic. In experiments on rabbit and cat eyes, Velhagen found it had a hormone-like action, which in rabbit eyes was stronger than that of pilocarpin and almost as powerful as that of eserin. A 0.25 percent solution of eserin had about the same effect as a 0.75 percent solution of Lentin. It produces a greater reduction of tension when instilled in the conjunctival sac than when given intravenously. There is a mild initial rise of tension. Atropin acts antagonistically. As to toxicity, Velhagen found that a 0.75 percent solution of carbaminoylcholin was about as toxic as a 0.25 percent solution of eserin. The preparation is stable and can be boiled.
Frederick C. Cordes.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Attimonelli, R. **Ametropia in the primary schools of Bari.** Ann. di Ottal., 1933, v. 61, Sept., p. 699.

Examination was made of the eyes of 1,774 children of the second to the fifth class in the two principal schools of that city. Of these 165 or 9.3 percent of all the pupils were ametropic. Among the trachomatous, aside from those having corneal opacities, there was a disproportionate number of myopes as related to the total number of ametropes (19.8 percent to 38 percent). Park Lewis.

Berke, R. N. **Changes in refraction with hyperglycemia.** Amer. Jour. Ophth., 1933, v. 16, Dec., pp. 1087-1090.

Chavasse, Bernard. **The nature and antiquity of stereopsis.** Trans. Ophth. Soc. United Kingdom, 1931, v. 51, pp. 268-285.

The author studied the movements of fishes' eyes in relation to movements of the head and body. When a fish turned a corner, the eyes made jerky nystagmoid movements with slow returning components. The visual fields were found in part to be binocular; and when a fish espied prey he could maneuver so that the prey should lie in the binocular field. Then swimming toward it, he did not open his mouth until within a fixed striking distance. Some fish actually converge; the author calls this grade 2 of stereopsis. He concludes with a classification of visual reactions.

Thomas D. Allen.

Dedimos. **The pathogenesis of photopsias and of ophthalmic migraine.** Arch. d'Opht., 1933, v. 50, Oct., p. 677.

Photopsias associated with either local or general conditions are shown to be due to increase in retinal arterial blood pressure with stimulation of the rods and cones. In most cases ophthalmic migraine is here regarded as due to sudden augmentation of arterial pressure in consequence of arterial spasm in the optic centers.

M. F. Weymann.

Eggers, Harry. **An important type of prismatic distortion.** Arch. of Ophth., 1933, v. 10, July, pp. 96-97.

One source of discomfort in the wearing of prisms is the curvature of lines paralleling the base of the prism. The author shows by simple geometric calculations that such lines are actually curved, with their convexity towards the base of the prism. M. H. Post.

Eggers, Harry. **An inexpensive telescopic spectacle.** Arch. of Ophth., 1933, v. 10, Oct., pp. 515-517.

The writer describes an inexpensive telescopic spectacle constructed on the principle of the Galilean telescope. The reading distance is about 21 cm., as against about 12 cm. in the usual Zeiss combination. The spectacles may be folded to fit into an ordinary spectacle case. M. H. Post.

Friedenwald, J. S. **Monocular myopia.** Trans. Amer. Acad. Ophth. and Otolaryng., 1932, 37th annual meeting, p. 265.

A statistical study of 12,500 successive cases seen in private practice was made to determine the causative factors in myopia other than normal variations in size of the eyeball. Cases in which myopia was due to keratoconus or to sclerosis of the lens nucleus were ruled out. Furthermore, only cases showing myopia of one diopter or more, and cases in which the myopia of one eye was at least twice as great and at least one diopter more than that of the other eye were included. Only 136 cases were found which fulfilled these requirements, and of these forty-three percent were of normal myopia, forty-two percent pathological myopia, and fourteen percent secondary myopia. The findings that pathological and secondary myopia is relatively more frequent among monocular myopes than among binocular myopes, and that the frequency distribution of various errors of refraction in these two groups of myopes is essentially the same, suffice to show that pathological myopia is not the result of or affected by eyestrain. The authors have grave doubts whether there exist any cases which may properly be called "reading myopia." (Discussion, three figures and five tables.)

George H. Stine.

Gammage, F. V. **Retinoscopy.** Arch. of Ophth., 1933, v. 9, Jan., p. 103.

A green eye shade of celluloid is worn by the examiner during retinoscopy, so as to intercept the direct rays of light falling from the electric light bulb into his eyes. M. H. Post.

Gertz, H. **A new exposition of the elementary theory of the optic system.** Acta Ophth., 1933, v. 11, no. 3, p. 251.

This is an explanation of mathematical formulae applied to the study of optics. Ray K. Daily.

Grimm, R. **Criticism of the Czermak-Helmholtz prism and palpation experiment.** Graefe's Arch., 1933. v. 130, p. 339.

The author's views agree essentially with those of Ruben and Redingius, that this prism experiment demonstrates the inner connection of the impulse coordinating the ocular muscle system with that of the body. The visual organ leads, the muscular sense of the body, especially of the grasping organ, follows as a well-trained horse suits his actions to those of his rider.

H. D. Lamb.

Jackson, Edward. **Changes in astigmatism.** Amer. Jour. Ophth., 1933, v. 16, Nov., pp. 967-974.

Karbowski, M. **The anatomical and physiological basis of color perception.** Graefe's Arch., 1933, v. 130, p. 469.

Modern theories as to the functions of the discs in the outer limb and of the myoid in the inner limb of the cones as regards color perception are reviewed. The process of color vision is divided fundamentally into three types: (1) monochromatic monocular in which rays of a single wave-length fall upon the cones; (2) polychromatic monocular in which rays of different wavelengths strike the cones; and (3) polychromatic binocular in which rays of different wave lengths fall upon corresponding cones of both eyes.

H. D. Lamb.

Kravkov, S. **A reply to Professor Zikulenko's remarks.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 440. (See Zikulenko.)

Kravkov, S. W., and Semenovskaja, E. N. **Increased sensitivity of the eye to light from preceding light exposure.** Graefe's Arch., 1933, v. 130, p. 513.

With Nagel's adaptometer, a preceding light stimulus did not produce diminution but actually increase of sensitivity to light. The same improvement after prior illumination was also observed when the prior stimulus had been applied to one eye and light sensitivity was tested in the other eye.

H. D. Lamb.

Lindberg, J. D. **Direct and inverse astigmatism in private practice, with particular reference to cases of direct astigmatism in one eye and inverse in the other.** Acta Ophth., 1933, v. 11, no. 3, p. 264.

Analysis of 2122 private patients with astigmatism of 0.5 diopter or more shows that 50.8 percent had inverse astigmatism and 42.6 percent direct. This agrees with Kadama's statistics from Japan, contrary to the generally accepted view that direct astigmatism is more prevalent. Of 1143 patients under forty-three years of age, 42 percent had inverse astigmatism and 51 percent direct. Of 674 patients with not less than 1 diopter of astigmatism 67 percent had direct and 27 percent inverse—a proportion approaching that of the majority of published statistics. The author attributes the difference in statistics to the fact that a private clientele includes many patients with low refractive errors which are prone to be overlooked in clinics, and he questions the accuracy of statistics based on hospital clinics. In his series nineteen patients had direct astigmatism in one eye and inverse in the other. Eleven of these were myopes, and in most cases the myopia was higher in the eye with inverse astigmatism. This leads the author to conclude that the inverse astigmatism developed while the eyes were becoming myopic, or losing in hyperopia, and he believes with Steiger that inverse astigmatism is as a rule acquired and not congenital. Ray K. Daily.

Samoilov, A., and Kotliarenskaia, C. **Clinical studies in color vision.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 242.

This is a tabulated report of the examination of sixty patients with defective color vision, controlled by the Nagel anomaloscope, with Ishihara's charts. While examination with these charts cannot entirely differentiate between color blindness and an anomaly in color vision, the information it affords is of practical value. Anomalies in color vision can be eliminated if the mistakes are confined to charts 5 and 11. Mistakes in other charts point to a de-

ficiency in color vision, and further differentiation between anomalous trichromates and dichromates is possible. Ray K. Daily.

Schubova. T. B. **The effect of ocular fatigue on sensitiveness to differentiation.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 281.

In seeking criteria for measuring ocular fatigue the writer sought to determine whether ocular fatigue diminished differentiation sensitivity. The test was made by means of a revolving background half gray and half white, to which were glued round pieces of white and gray paper, and the means of inducing fatigue was three to four hours of close work. The tabulated report shows that ocular fatigue prolongs the time required to focus the eyes for clear vision, but has no effect on differentiation sensitivity. Ray K. Daily.

Semonovskaia, E. **The influence of glare on clearness of vision.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 432.

The author used the unfrosted side of a 100-watt lamp, with Landolt's rings and the test of Ferree and Rand. Although all test subjects found this source of light annoying and disagreeable, it had no influence on acuteness of vision or on the time required to adjust the eyes for clear vision. The subjective disagreeable sensations must therefore be attributed to the effect of the glare on some other function of the eye. Ray K. Daily.

Teplov, B., and Jakovleva, S. **The law of mixing of colors in the retina according to space and time.** Graefe's Arch., 1933, v. 130, p. 463.

The authors' experiments did not confirm the findings of Lempicka but established the entire identity of the quantitative laws of color mixing according to space and time. In all, there were employed five pairs of colors, red-green, red-blue, yellow-blue, green-blue and green-violet. Variations from the average were not greater than one degree, that is, within the limits of accuracy of observation. H. D. Lamb.

Wieland, Max. **Observations on color weakness in female transmitters.** Graefe's Arch., 1933, v. 130, p. 441.

Thirty-four female transmitters of color anomalies for red and green were examined as to their threshold for these colors (the least amount of stimulus needed to produce the specific sensation for that color). In 14 percent of the deuteranope group, there was an elevated threshold for red, and in 6 to 28 percent of the same group an elevated threshold for green. Among the protanope group about 40 percent presented a definite elevation of the red and 11 to 12 percent of the green threshold. The average value of the Rayleigh equation with the anomaloscope was shifted toward the green in all female transmitters including protanopes. H. D. Lamb.

Zikulenko, K. **"Minimum separabile" from the standpoint of the hypothesis of the pigment prism.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 436.

This comments on a reference made by Kravkov in his book "The eye and its function" to Zikulenko's theory of visual perception. Ray K. Daily.

4. OCULAR MOVEMENTS

Dor, Louis. **Strabismus and avitaminosis.** Arch. d'Opht., 1933, v. 50, Oct., p. 667.

It is possible that some developmental factor causes hyperopia, amblyopia, and strabismus rather than that the strabismus causes the amblyopia. Feeding of vitamins to adults with strabismus had no effect. An infant eleven months old with a history of strabismus in the family was cured of intermittent convergent strabismus by the feeding of vitamin A. The writer believes that insufficiency of vitamin A may be a factor in the development of strabismus where hereditary predisposition exists. M. F. Weymann.

Esteban, M. **Fibrillary contractions of the orbicularis.** Rev. Cubana Oto-Neuro-Oft., 1932, v. 1, Nov.-Dec., p. 411.

There is always a neurotic element in such cases, and psychotherapy is indi-

cated. Correction of ametropia is one of the psychotherapeutic measures. Strychnine injections, with appropriate suggestions, cured one rebellious case reported in detail.

M. Davidson.

Fuchs, B. I., and Kolen, A. A. **The use of fascia lata in the correction of strabismus.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 236.

In a case of extreme upward and convergent strabismus of the left eye, associated with microphthalmos, tenotomy of the superior rectus was practically without effect. The second operation consisted of tenotomies of the inferior oblique and internal rectus, and advancement with resection of the inferior rectus. There was some improvement but the deviation was still very marked. One year later a 4 cm. loop of fascia lata 0.5 to 0.75 cm. wide was thrown around the tendon of the external rectus, was passed through a tunnel, and was sutured to the periosteum of the outer lower angle of the orbit. The eyeball was pulled downward and outward by the pull of this loop on the external rectus, and the result was satisfactory.

Ray K. Daily.

Litinsky, G. **Paradoxical absence of strabismus in paralysis of the abducens.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 401.

The author reports three cases of paresis of the left abducens without convergence of the visual axes, and with normal depth perception. He explains this phenomenon by a preexistent exophoria neutralizing the tendency to convergence, and by a highly developed fusion sense. Ray K. Daily.

Luhr, A. F., and Eckel, J. L. **Fixation and voluntary nystagmus: a clinical study.** Trans. Amer. Acad. Ophth. and Otolaryng., 1932, 37th annual meeting, p. 213. (See Amer. Jour. Ophth., 1933, v. 16, Aug. p. 748.)

Ohm, J. **Contribution to the knowledge of nystagmus. Communication 32. The vestibular reaction to turning in congenital nystagmus.** (Part 1.) Graefe's Arch., 1933, v. 130, p. 527.

In persons with congenital nystagmus subjected to the rotating test, the congenital is opposed to the vestibular and the optokinetic nystagmus. The author plans to investigate with the turning test thirty-two cases of congenital nystagmus. Six of these cases are illustrated in the present article.

H. D. Lamb.

Osterberg, G. **On the associated side movements of the eyes.** Acta Ophth., 1933, v. 11, no. 3, p. 329.

After a review of the literature on the mechanism of voluntary and reflex lateral movements of the eyes, the author reports the case of a farmer twenty-five years of age, who because of headache and difficulty in reading came to the clinic to be refracted. There it was found that for many years he had had total abolition of lateral movements of the eyes. He also had an intermittent oblique nystagmus and a rhythmic tremor of the head. The author believes that these symptoms can be accounted for by a lesion in the medial sulcus of the rhomboidal fossa, on a level with the colliculus facialis. Ray K. Daily.

Pesme, P. **Three cases of bilateral nuclear ophthalmoplegia.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, Jan.-Feb., p. 11.

Of three cases of bilateral nuclear ophthalmoplegia one occurred in measles, another was attributed to lues although the blood Wassermann was negative, and the third was considered of diphtheric etiology although the throat culture was negative. The subordination of laboratory findings to clinical observation was justified in the last two cases by the effect of specific therapy, both cases recovered completely thereunder. The first two cases are regarded as manifestations of subacute polioencephalitis, as due to encephalomyelitis. M. Davidson.

Smith, E. T. **Ocular torticollis: inferior oblique tenotomy and its indications.** Med. Jour. Australia, 1933, v. 2, Sept., p. 307.

With paresis of one superior rectus the opposite inferior oblique overacts in

certain positions, the initial diplopia becomes accentuated, and the individual reacts by convergence or by tilting the head. Smith recommends tenotomizing the inferior oblique in such cases. (Three figures.) Ralph W. Danielson.

Smukler, M. E. **Amblyopia and squint from head injuries at birth.** Pennsylvania Med. Jour., 1933, v. 37, Oct., p. 25.

Smukler reviews literature indicating that ten to fifteen percent of newborn children have retinal hemorrhages and about the same number have brain hemorrhages as shown by spinal puncture. He believes that these retinal hemorrhages cause amblyopia and secondarily the state of squint, for the percentage of children with amblyopia is greater in first-born children. (One table and eleven references.)

Ralph W. Danielson.

5. CONJUNCTIVA

Argaud, R., and Cange, M. A. **Trachomatous hyperplasia of the glands of Hugo Moll.** Arch. d'Opht., 1933, v. 50, Oct., p. 663.

A drawing of a histological section near the ciliary border of the lid in a trachomatous individual is given to demonstrate marked glandular hyperplasia of the glands of Moll and the proliferation of myoepithelial cells.

M. F. Weymann.

Blegvad, O. **Tuberculosis of the conjunctiva.** Acta Ophth., 1933, v. 11, no. 3, p. 345.

After a review of the literature the author reports four cases of conjunctival tuberculosis. In all four the infection was primary, was associated with regional glandular enlargement, and had no tendency to further extension; while the diagnosis was confirmed by inoculation into guinea pigs, and the bacillus was of the bovine type. All patients were exposed to diseased cows. The author concludes that the infection was ectogenous and that the conjunctiva was infected through direct contact with infectious material.

Ray K. Daily.

Cepero, G., and Comas, L. **Iotion in treatment of hordeolum.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, March-April, p. 103.

Iotion (a preparation of iodin) applications are highly recommended for hordeola and chalazia.

M. Davidson.

Chirkovskij, W. W. **Classification and registration of trachoma.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 337.

For purposes of registration the author proposes division of trachoma into four groups. Group one includes trachoma cases in the stage of follicular infiltration. In group two are the cases with follicles, papillary hypertrophy, and beginning cicatrization. Group three is characterized by advanced cicatrization and the presence of follicles. Group four consists of cases with complete cicatrization but without follicles —the noncontagious stage.

Ray K. Daily.

Dubinov, O. I. **The genesis of epitarsus.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 286.

According to the author, conjunctival membranes extending from the transitional fold to the tarsus are not congenital but result from acute Koch-Weeks conjunctivitis. He proposes the name "pseudopterygium" of the tarsus for these sequelae of inflammatory processes, as distinguished from congenital epitarsus. Ray K. Daily.

Michailova N., and Potechina E. **Roetgenotherapy in trachoma.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 424.

Since 1929 the authors have treated 116 children in various stages of trachoma with monthly exposures of 3.5 skin erythema dosages. They conclude that roentgenotherapy is effective in all stages of trachoma in dosage harmless to normal ocular structures. It is particularly suitable in the treatment of children, because of its painlessness. It has no effect on pannus.

Ray K. Daily.

Pascheff, C. **The formation of tubercles in vernal conjunctivitis.** Arch. d'Opht., 1933, v. 50, Oct., p. 670.

Of 272 patients afflicted with vernal catarrh the great majority were under twenty years. Of 145 whose blood was examined, 38 showed lymphocytosis, 31 eosinophilia, and 51 a combination of eosinophilia and lymphocytosis, and in the same group 85 showed increased tonsillar and adenoid tissue. Out of 162 x-rayed, 109 showed tracheobronchial adenopathy. In four cases nodules in the bulbar conjunctiva proved to be tubercles upon histological examination. They disappeared without ulceration and left no scar. The author asks whether vernal catarrh may be considered a tuberculous anaphylactic reaction. M. F. Weymann.

Rollet, J., and Müller, A. R. **Climatic-geographic factors in trachoma.** Rev. Cubana Oto-Neuro-Oft., 1932, v. 1, Nov.-Dec., p. 373.

A study of the climatic and geographic distribution of trachoma shows its greatest prevalence to coincide with a mean annual temperature of from 15 to 25 degrees centigrade, with an annual rainfall of less than 50 cm., and with primary and tertiary soils. In Spain the greatest prevalence of trachoma is in Andalusia and the eastern provinces, where the mean annual temperature is twenty degrees centigrade, and the annual rainfall is between 20 and 40 cm. In the province of Guipuzcoa, with more than a meter of annual rainfall and with more temperate climate and cold northern winds prevailing, no trachoma is found. M. Davidson.

6. CORNEA AND SCLERA

Filatov, V. **Complete transplantation of the cornea.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 217.

After a review of the literature, the author reports in detail the operative technique and clinical course of a case in which he transplanted the anterior segment of the eyeball including the iris and the ciliary body from the patient's right eye (blind from absolute glaucoma) to the patient's left eye, which had become staphylomatous as the result of a serpigenous ulcer treated with the thermocautery. The author believes that transplantation of the angle of the anterior chamber prevents the development of postoperative glaucoma. At the time of this report, eight months after the operation, the patient could count fingers at 1.3 meters and there were in the cornea degenerative (vascularization) and regenerative (a tendency to clearing) processes side by side. The final result was thus still uncertain.

Ray K. Daily.

Korenewitch. I. **Typical corneal changes in vernal catarrh and their similarity to injury of the cornea by ultraviolet rays.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 389.

The general conception of vernal catarrh as a disease limited to the conjunctiva is incorrect, for the slitlamp shows numerous fine erosions of the corneal epithelium in every case of vernal catarrh, particularly abundant on the outer portion of the cornea covered by the upper lid and in the nasal portion of the palpebral fissure. These lesions cause the lacrimation and photophobia. They are identical with those of photophthalmia due to ultraviolet rays, and this identity in pathology in suggestive of a close etiologic relation. The ultraviolet rays of the sun probably cause vernal catarrh in people with a constitutional predisposition.

Ray K. Daily.

Orlov, K. X. **Surgical treatment of trachomatous pannus.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 228.

In doing Denig's transplantation of mucous membrane of the lip for trachomatous pannus it was noticed that the best results were obtained in cases in which the transplant was so thick that it formed a roll above the upper limbus. The conclusion was that the effect of the operation was due to the transplant holding the upper lid away from the cornea, thus relieving the cornea from continuous irritation by the upper lid. Goldfeder suggested that instead of transplanting mucous membrane from the lip a piece of auricular

cartilage should be implanted at the upper limbus under the conjunctiva. In over one hundred cases in which this was tried the results were better than those following Denig's operation.

Ray K. Daily.

Shapira, T. M. **Steatosis bulbi with special reference to the cornea.** Amer. Jour. Ophth., 1933, v. 16, Dec., pp. 1080-1086.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Archangelskii, V. **Pathology of intraocular tuberculosis.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 382.

Photomicrographs of nine eyes enucleated because of this disease and two eyes enucleated from children dead of miliary tuberculosis show that extension of the diseased process and localization of isolated lesions depends on the three separate vascular systems of the eyeball; that specific histologic changes may not be found; and that the presence of specific microscopic changes depends on the degree of the organic reaction and the stage of the disease. Very early and very late changes frequently lack specific histologic features, so that there are no absolute histologic criteria for diagnosis without a clinical history.

Ray K. Daily.

Arroyo de Marquez, T. **Notes on diagnosis and therapy of ocular tuberculosis.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, Nov., p. 674.

Tuberculosis is assumed with negative Wassermann in asthenic young individuals with pulmonary history and presenting uveitis. Progressive injections of tuberculin emulsion, avoiding local or general reaction, are recommended. M. Davidson.

Behr, Carl. **Participation of the antagonists in pupillary movement for various reactions.** (Communication 2.) Graefe's Arch., 1933, v. 130, p. 411.

A girl of sixteen years had stuck a fork into the right eye at two years of age. The only permanent change in this eye apart from the faint corneal scar near the nasal limbus was a hole through the nasal side of the iris. The round shape of this hole when the pupil was of average physiological width indicated that the tonus of the sphincter and of the dilator were equally and considerably diminished. When light was directed into the eye, the circular form of the pupil changed into an oval with its longest diameter horizontal and its inner end slightly pointed. This would imply that the light reflex caused a diminution of the tonus of the dilator in a degree parallel to the increase of tonus in the sphincter. In accommodation or convergence the circular diameter of the hole diminished more than half while the radial cross section became definitely larger, indicating that increase of tonus in the sphincter was not accompanied by simultaneous diminution of tonus in the dilator. Sensory and psychic stimuli caused shortening of the radial cross section of the hole and increase in circular diameter. Various other observations as to the behavior of the iris hole are described, including the effects of drugs. H. D. Lamb.

Castelli, A. **Clinical and biomicroscopical observations in a case of congenital aniridia.** Ann. di Ottal., 1933, v. 61, Aug., p. 613.

This case was in a girl of thirteen years whose parents were free from syphilis and tuberculosis. There was no discoverable visual abnormality in them or in any other relatives for several generations. There was no marked photophobia and no nystagmus. Vision was 3/10 in each eye, with correction of moderate myopia. Under tangential illumination complete absence of both irides was demonstrated. In the left, a fine filament crossed the anterior lens capsule obliquely. Slight opacities in the lens are shown in a plate of seven photomicrographs. The accommodative power was diminished. There were marked intraocular hypertension, a low grade microphakia, and aplasia of the fovea. The left elbow joint was slightly shorter than the right. The literature is reviewed and a short critical analysis is given of the principal theories. (Bibliography.) Park Lewis.

Churgina, E. **The diagnosis of tuberculous uveitis.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 372.

The author points out the lack of absolute certainty in the clinical and laboratory diagnosis of ocular tuberculosis. Local tuberculin reactions do not establish a focal tuberculous etiology and there are no clinical symptoms absolutely pathognomonic of this disease. Several clinical histories illustrate the confusion of this condition with syphilis and sympathetic ophthalmia.
Ray K. Daily.

Dudinow, O. A. **A rare case of persistent pupillary membrane adherent to the cornea.** Zeit. f. Augenh. 1933, v. 81, Oct., p. 336.

This most extensive and thick pupillary membrane was adherent to a dense and sharply delimited opacity of the upper third of the cornea. The membrane took origin from the pupillary margin and in some areas from the posterior surface of the iris, instead of from the lesser circle as is more usual; hence it must have arisen very early in fetal life.
F. Herbert Haessler.

Edgerton, A. E. **Heterochromia and cataract.** Amer. Jour. Ophth., 1933, v. 16, Dec., pp. 1076-1079.

Esteban, M. **Iridocyclitis from tattooing.** Rev. Cubana Oto-Neuro-Oft., 1932, v. 1, Nov.-Dec., p. 414.

Tattooing of an extensive leucoma adherens, in which one and a half months earlier an iridotomy had been performed for hypertension, gave rise to uveitis which necessitated enucleation.
M. Davidson.

Mohn, A. **A case of uveoparotid fever.** Acta Ophth., 1933, v. 11, no. 3, p. 397.

In 1909 Heerfordt described a disease characterized by protracted course, chronic parotitis and uveitis, and paresis of some of the cranial nerves; and he named this disease uveoparotid fever. The author reports a case, supporting the tuberculous etiology, in a woman of twenty-eight years, with a family history of tuberculosis. She ran a temperature for months, and during the course of the illness she had extensive adenitis, paralysis of the facial, hypotony of the upper extremities, slight spastic paresis of the lower extremities, and severe uveitis with nodules in the iris, numerous precipitates on the posterior corneal surface, and greatly reduced vision. Two months after onset of the disease an active tuberculous process was demonstrated in the lungs.
Ray K. Daily.

8. GLAUCOMA AND OCULAR TENSION

Ademuk, V. E. **Report of the first series of igneous sclerociliarotomies (Fiore) for glaucoma.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 230.

The appeal of this procedure is in its technical simplicity and mild postoperative reaction. The difference between it and Elliot trephining is that the fistula in the sclera is made with the electrocautery instead of the trephine. Of this series of seventeen cases, sixteen were of absolute glaucoma with very high tension. Two cases could not be followed. In seven cases tension came down to normal. In six it was greatly lowered, but not quite normal. In two the procedure was ineffectual, and in these subsequent Elliot trephinings were also without effect. Whether like the Elliot operation this procedure may result in a cystoid cicatrix or produce late infection will be determined by further observation.
Ray K. Daily.

Dumschiz, L. **Variations in depth of the anterior chamber in glaucoma.** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 346.

Detailed measurement of the depth of the anterior chamber of forty-two glaucomatous eyes shows that in inflammatory glaucoma the anterior chamber may be deep or shallow. A shallow anterior chamber is a precursor of the disease and not its result. Inflammatory glaucoma is characterized by a shallower anterior chamber than simple glaucoma. There is no relation between the depth of the anterior chamber and the height of the intraocular tension.
Ray K. Daily.

Nelander, Bengt. **Frequency of primary glaucoma.** Acta Ophth., 1933, v. 11, no. 3, p. 370.

This is a study of the frequency of glaucoma in Upsala, Sweden, between 1923 and 1932. It shows 2.75 cases per thousand of the population during these nine years; the frequency is slightly greater in women (3.2 per thousand) than in men (2.2 per thousand). Of the total of seventy-five cases seventy-four were in patients over fifty years of age. The danger of glaucoma rises from the age of fifty, to reach its peak between eighty and ninety years of age. Fifteen percent of the cases were acute in type and the rest were of simple glaucoma.

Ray K. Daily.

Oguchi, Ch. **An epibulbar hamartoma in hydrophthalmos.** Graefe's Arch., 1933, v. 130, p. 432.

An eighteen-year-old glassworker had had hydrophthalmos of the left eye since birth. In the enucleated eye, an enormously thick layer of tissue was found adherent to the sclera at the temporal side of the entrance of the optic nerve. This layer consisted of cavernous vessels, striated muscles, fatty tissue, and thickened and irregular connective tissue. This formation corresponded to the congenital malformation designated by Albrecht as hamartoma.

H. D. Lamb.

Sondermann, R. **A study of the origin, morphology, and function of Schlemm's canal.** Acta Ophth., 1933, v. 11, no. 3, p. 280. (See Section 19, Anatomy and embryology.)

Stein, R. **Tolerance tests in diagnosis of glaucoma.** Med. Klin., 1933, v. 29, Sept. 8, p. 1231.

In tolerance tests which permit an increased vascularization, glaucomatous eyes show fluctuations in the tension much greater than normal eyes. The tests consist of injections of caffeine or drinking of strong coffee, or inhalation of three to five minims of amyl nitrite. Beulah Cushman.

9. CRYSTALLINE LENS

Edgerton, A. E. **Heterochromia and cataract.** Amer. Jour. Ophth., 1933, v. 16, Dec., pp. 1076-1079.

Gifford, S. R., and Puntenny, I. **The biochemistry of the lens. 2. A study of cataracta nigra and cataracta brunescens.** Amer. Jour. Ophth., 1933, v. 16, Dec., pp. 1050-1060.

Gonzalez, J. de J. **Loss of visual orientation after cataract operation.** Rev. Cubana Oto-Neuro-Oft., 1932, v. 1, Nov.-Dec., p. 377.

After a successful operation for cataract, with vision of 8/10 and only slight contraction of fields, a woman of seventy years was found unable to orient herself or to avoid obstacles in walking. (There had been bilateral cataract for ten years, and the fellow eye had been lost from infection following extraction shortly before.) She walked at first without turning her eyes, and seemed unable to initiate a turning movement. A series of psychosensory and psychomotor exercises finally reeducated the patient. The author argues for a dissociation of the complex of objective visual orientation in space by ten years of blindness. M. Davidson.

Kirby, D. B. **The mechanism of senile cataract.** Amer. Jour. Ophth., 1933, v. 16, Dec., pp. 1041-1047.

Kirby, D. B., and Wiener, R. E. **A study of the relation of disturbances of carbohydrate metabolism to cataract.** Trans. Amer. Acad. Ophth. and Otolaryng., 1932, 37th annual meeting, pp. 142-212.

This final report by the Academy research fellow in ophthalmology is reported under the following divisions: (1) Analysis of eighty-eight diabetic cases for type of lens opacity and other factors. (2) Carbohydrate metabolism of fifty-six patients with cataract by dextrose tolerance and dextrose depletion (insulin reaction) tests. (3) Dextrose concentration in primary aqueous humor and capillary and venous blood. (4) Changes in dextrose concentration of capillary and venous blood and of

aqueous humor during dextrose tolerance and dextrose depletion tests, and after food intake. (5) Effect of increased dextrose concentration in the nutrient media on lens epithelium cultures grown in vitro, and effect of levulose and galactose on such cultures. (6) Effect of additions of acetone and beta-hydroxybutyric acid in increasing concentration on growth of lens epithelium in vitro. (Many figures and tables, and an extensive bibliography.)

George H. Stine.

Lebensohn, J. E. **The biochemistry of the lens. 3. Water equilibrium in the normal and cataractous lens.** Amer. Jour. Ophth., 1933, v. 16, Dec., pp. 1062-1075.

Poyales, F. **Preoperative, operative and postoperative complications in cataract extraction.** Rev. Cubana Oto-Neuro-Oft., 1932, v. 1, Nov.-Dec., p. 385.

The lessons of twenty years of cataract surgery, with reference to local and to general conditions, are summarized. Test bandaging has not proven of value. More than six streptococcus or staphylococcus colonies or an association of the two, or pneumococci require sterilization of conjunctival sac. Obliteration of puncti or extirpation of sac is necessary in ozena. Neither trachoma nor pterygium is a contraindication. A contact glass has been used successfully in lieu of bandage after extraction in the presence of an inoperable double ectropion. Linear extraction is less dangerous than discission in infantile or juvenile cataract, if the patient is old enough to cooperate. Barraquer's method is best adapted for hard nuclear or capsular cataract at about fifty years. Smith's is most appropriate at about sixty-five years and in Morgagnian cataract. Forceps extraction is applicable in all senile cataracts. The only indication for extracapsular extraction is in hypermature cataract.

The cornea is always turned down to expose iris and lens, and the advantages of the maneuvre compensate for the slight descemetitis and striae noted after it. Many other miscellaneous details are discussed. M. Davidson.

Vorobeichikov. **Ionization device for the rural oculist.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 295.

The author describes a home-made device, using dry batteries which may be assembled under rural conditions. He used sodium iodide on twenty-six cataracts and believes that in incipient cases he inhibited the progress of the disorder. Ray K. Daily.

10. RETINA AND VITREOUS

Biffis, A., and Quaglio, G. **Experimental research on lens antigen therapy.** Ann. di Ottal., 1933, v. 61, Sept., p. 641.

After extraction of cataract from the eye of a colleague a considerable amount of cortex remained, which at the end of two years was still not absorbed. A few days after operation on the fellow eye absorption progressed rapidly and very soon the residual opacities had disappeared.

Marquez has suggested that this phacolytic action is due to the aqueous being brought in contact with the fibers of the degenerate lens, so as to produce a lens antigen. The authors experimented on thirty-one rabbits, using antigenic injections prepared from human cataractous lenses and also from fresh ox lenses. They failed to demonstrate any difference in behavior between rabbits so treated and those used as controls. Park Lewis.

Cooper, S., Creed, R. S., and Granit, R. **A note on the retinal action potential of the human eye.** Jour. of Physiology, 1933, v. 79, Sept., p. 185.

In this very technical paper the authors state that responses from the periphery of the retina (30° from the fixation point) resemble those from the center in general features, but less potential is developed. The significance of this is discussed. (Two figures and ten references.) Ralph W. Danielson.

Esteban, Mario. **Ocular derangements of hepatic origin.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, March-April, p. 114.

Hemeralopia has been observed in seven cases of hepatic disease. It always

disappears with disappearance of icterus. Cholemia is believed responsible, although autointoxication from the intestinal tract is regarded as a possible cause. M. Davidson.

Hernandez Arios, R. **Retinitis circinata.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, Jan.-Feb., p. 24.

The literature of this rare fundus picture is reviewed, with a colored fundus drawing of a case, and list of references. M. Davidson.

Holm, Ejler. **Detachment of retina following an orbital phlegmon.** Det oftalmologiske Selskab i Köbenhavn's Forhandlinger, 1932, p. 15. In Hospitalstidende, 1933, Sept. 14.

A woman of fifty-six years had influenza in March, 1932. The attack was followed by vomiting and fever, pain and tenderness in the left eye, and later protrusion of the left eyeball. Iritis with synechiae, and opacities and cloudiness of the vitreous, developed. Fourteen days after onset, detachment of the retina was noticed in the lower half, and this spread until it reached the disc. Palliative treatment was used. Six months after onset, the detachment had entirely disappeared, but the area of detachment showed scattered, small round spots of pigment, the disc was atrophic, and the vessels narrow. Vision was 6/9. It is assumed that orbital inflammation produced uveitis from which subretinal exudation resulted. D. L. Tilderquist.

Juhasz-Schäffer, Alexander. **Circumscribed depression in the nervehead.** Zeit. f. Augenh., 1933, v. 81, Oct., p. 314.

Holes in the optic nervehead have been reported forty-two times. The author observed this lesion in one eye of each of two patients, but there were no other findings to suggest cause or course of development. F. Herbert Haessler.

Kapuscinski, W. **Detachment of the retina (with remarks on the mechanics of movements of the interior of the globe).** Ann. d'Ocul., 1933, v. 170, Nov., pp. 920-947.

The first part of the paper deals with the subject from the mathematical standpoint. A detailed discussion follows, taking into consideration myopia, cystic degeneration of the retina, nystagmus, hypotony, and idiopathic detachment. The theories of Best, Lindner, and Gonin are dealt with at some length. (Bibliography.) H. Rommel Hildreth.

Keith, N. M. **Cardiovascular diseases in relation to the retina.** Trans. Amer. Acad. Ophth. and Otolaryng., 1932, 37th annual meeting, p. 37.

Spasm of the arterioles may or may not lead to retinitis. When spasm coexists with histological arteriolar lesions, retinitis and thrombosis result. Relaxation or intensification of arteriolar spasm may explain the remissions and exacerbations that occur during the course of diffuse arterial disease. The possibility that there are peripheral compensatory mechanisms when even serious arteriolar lesions exist is suggested. Retinal vascular changes are of practical prognostic significance.

Two cases of essential hypertension associated with arteriolar spasm, three cases of angiospastic retinitis (albuminuric) with glomerulonephritis, and five cases of essential hypertension associated with diffuse arterial disease are reported. (One table, bibliography.) George H. Stone.

Kohn, Alfred. **On the structure of the retina as foundation for classification of neurons.** Med. Klin., 1933, v. 29, Oct. 1, pp. 1348-1350.

The author points out contraindications of the customary nomenclature and classification of neurons in the retina. Optic cells are sensory cells, and rods and cones are transformed cell substance which should not be interpreted as neurons or dendrons. In one group we have to differentiate between: (a) neurons with head-regulated, nonbranching nerve cells, to which belong unipolar and especially neuroepithelial cells, also the olfactory and optic cells; and (b) neurons with head-regulated, branching nerve cells. A second group includes neurons with a middle regula-

tion (Sobotta), divided into two classes: (a) nerve cells with inner regulation, including the former "bipolar," for example the ganglion cells, nervus acusticus; (b) nerve cells with side regulation, to which belong the so-called "pseudounipolar."

Beulah Cushman.

Lijo Pavia, J. **Hole in the macula from severe iridocyclitis of unknown etiology.** Rev. Oto-Neuro-Oft., 1932, v. 7, Nov., p. 478.

A case observed for several years is reported with fundus photographs. Macular lesions in iridocyclitis are often overlooked because they are seen with difficulty except in red-free light. Focal infection was the most likely etiology in this case. M. Davidson.

Lindner, K. **Therapeutic attempts in cases of retinal detachment with bad prognosis.** Zeit. f. Augenh., 1933, v. 81, Oct., p. 277.

In those cases of retinal detachment in which the prognosis is poor because the retina has become too short, it would still be possible to bring about reattachment if the scleral capsule could be decreased in size. For this purpose Lindner has excised strips of sclera one-fourth the circumference of the eyeball in length, and in width extending almost from the ora serrata to the vortex veins. The incision is made almost through the scleral thickness, exactly parallel to the limbus. Catgut sutures are placed deeply through the edge of the sclera so that the catgut is separated from the choroid only by the deepest scleral lamellae. Incision of the scleral strip is then completed with fine curved scissors, and each suture is tied as soon as the scleral flap has been pulled out from under it. Experience with several patients is described, and the results justify further trial.

F. Herbert Haessler.

McKeown, H. S. **Detachment of the retina: the Guist operation.** Trans. Amer. Acad. Ophth. and Otolaryng., 1932, 37th annual meeting, p. 240. (See Amer. Jour. Ophth., 1933, v. 16, April, p. 377.)

Marquez, M. **On some controversial points in the pathogenesis and treatment of detachment of the retina.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, Nov., p. 672.

The author suggests that the most important factor in pathogenesis is previous alteration of the relation of the rods and cones to the pigment epithelium, and that traumatic detachment of a healthy retina is not frequent. The subretinal fluid is not vitreous. Holes are not constant and are a complication producing a mixture of vitreous and subretinal exudate. Deep hypertonic saline injections within Tenon's capsule are effective. The criterion of result should be restoration of field rather than central visual acuity. Cauterization or irritation with the same hypertonic saline introduced by a special trochar-knife is combined with injections within Tenon's capsule.

M. Davidson.

Morelli, E. **Duration of spasm of central artery of retina.** Riv. Oto-Neuro-Oft., 1932, v. 9, Sept.-Dec., pp. 730-733.

A woman of thirty-two years found her left eye suddenly blind during treatment for luetic optic neuritis in the clinic. Pupillary reaction started ten minutes later and normal reaction in about an hour. Loss and recovery of pupil reaction recurred four times that day and three times the following day. The retina showed a circumpapillary paleness. Central vision came back, reaching 9/10. The papilla remained white but the visual field normal. In a neurotic girl of eighteen years, with blindness of the right eye and rigid pupil, the pupillary reaction and light perception returned in nine minutes. This recurred five times that day and the next day, when the eye disturbances disappeared with the appearance of menstruation. During this attack the retina was ischemic and no light perception was present. Ten days later the eye was entirely normal except that slight paleness of the disc was still present. A third case was similar to the second. Although the angiospasm in these cases apparently lasted several days, the real

duration of the spasm calculated on the disappearance and reappearance of the pupillary reaction was not more than fifteen minutes. The author thinks that closure of the central artery could not last more than fifteen minutes without causing a grave lesion.

M. Lombardo.

Moreu. A. **Consideration of pathogenesis and treatment of pigmentary degeneration of the retina.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, Nov., p. 653.

Two cases were treated with intravitreal injection of acetylcholine. One patient had malaria, the other had atrophic cirrhosis of the liver. Both also had annular interstitial pigment rings in the corneas, similar to those seen in keratoconus (Kaiser-Fleischer ring) and in Wilson's disease. The malarial case also showed pigmented lens opacities. Acetylcholine injected hypodermically produced no results. Intravitreal injection of a few drops of ten percent solution produced, aside from transitory vertigo and a sensation of warmth in the face, immediate ocular hypertension with turbidity of the vitreous. After twenty-four hours there was intense retinal vasodilatation with disappearance of the greater part of the retinal pigment masses. In six days the vitreous was clear, the hemeralopia had disappeared, and the scotomata and contraction of the fields had cleared up except for the enlargement of the blind spots. In five other cases the same treatment was of no avail, and these cases exhibited the factors of heredity and consanguinity. Two types of retinitis pigmentosa are therefore recognized: the classical hereditary and consanguineous type, and the postinfective or vascular type. The vascular type is amenable to the energetic use of vasodilators and hepatic organotherapy. Acetylcholine injections into the vitreous are harmless, and should be tried out in embolism of the central artery and in optic atrophy. M. Davidson.

Pischel, D. K. **Detachment of the retina—its present operative treatment.** Amer. Jour. Ophth., 1933, v. 16, Dec., pp. 1091-1101.

Rezende, Cyro de. **A case of retinal detachment treated with Vogt's galvanopuncture.** Rev. de Ophth. de São Paulo, 1933, v. 3, Sept., pp. 74-79.

In a woman of forty years, a very generalized detachment in the right eye, in which extremely minute and repeated examinations failed to reveal a tear, showed decided improvement after three days of rest in bed. But the detachment persisted in the upper temporal region over an area measuring two or three disc diameters in diameter. At the outer limit of this area of detachment, very close to the ora serrata, it was now possible to see a minute tear. After carefully estimating the exact position of the tear, the electrocautery was applied at a distance of 11 mm. from the limbus and on the meridian corresponding to the 10:15 o'clock position. (Although a fine cautery point was used for about two seconds, the printed report speaks of having made a hole in the sclera almost 0.5 cm. in diameter!) Twenty-five days after the operation, the vision of this eye, which had been in the neighborhood of 5/60 after the partial reattachment which followed rest in bed, had risen to 0.9.

W. H. Crisp.

Sédan, Jean. **The importance of subretinal fluid in the evolution of certain detachments of the retina.** Ann. d'Ocul., 1933, v. 170, Nov., pp. 947-958.

The author makes three observations based on recent experiences with diathermocoagulation. (1) The subretinal fluid in its pocket is under increased tension as evidenced by its rapid appearance under the conjunctiva after sclerotomy. This is true even though the general intraocular tension before operation was low. (2) This pocket of local hypertension favors spreading of the detachment. (3) The release of this tension at operation coincides with the good results from operating and permits the favorable action of electrocoagulation. H. Rommel Hildreth.

Wagner, H. P. **Arterioles of the retina in toxemia of pregnancy.** Jour. Amer. Med. Assoc., 1933, v. 101, Oct. 28, p. 1380.

Wagner studied fifty cases of a te toxemia without previous hyperte on, twenty-four with or without toxemia in which hypertension existed previous to the pregnancy, and analyzed eight cases for the relationship between retinal changes and persistent hypertension. Spastic lesions of the arterioles are the most frequent and usually the primary signs of retinal involvement in toxemia of pregnancy. They occur both in acute toxemia and in toxemia superimposed on previous vascular or renal disease, and exist in about seventy percent of cases of toxemia. In about sixty percent of such cases, the spastic lesions disappear with the termination of pregnancy, and the blood pressure returns to normal or to its previous level. In about forty percent of the cases organic lesions develop in the arterioles, often in association with retinitis; and such cases elevation of blood pressure usually persists. Diffuse retinitis of the albuminuric type is to be regarded as evidence of severe generalized arteriolosclerosis rather than of primary nephritis. Primary detachment of the retina occurring in the course of acute toxemia does not have the same serious clinical significance as diffuse retinitis. (Three tables, two figures, and discussion.) George H. Stine.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Cavina, C. **Mucocele of sphenoid sinuses, optic neuritis, operation, recovery.** Riv. Oto-Neuro-Oft., 1932, v. 9, Sept. Dec., pp. 750-759.

A man of twenty-five years complained of intense aching of the left side of the head and left eye. There was a marked defect of vision of this eye, and its disc was hyperemic and blurred. Radiography revealed an opaque left ethmoid, sphenoid, and antrum. Resection of the anterior wall of the sphenoidal sinuses released fluid contained in a cavity the size of a hen egg. The cranial bone was destroyed at that area. The operation was followed by complete recovery. (Six figures, references.) M. Lombardo.

De' Cori, R. **Retrobulbar neuritis of sinus origin.** Riv. Oto-Neuro-Oft., 1932, v. 9, Sept.-Dec., pp. 760-766.

A woman of twenty-one years had recurrent attacks of neuralgia of the left side of face, with obscuration of vision. She became suddenly blind in the left eye. Radiography showed hyperplastic sphenoiditis. The neuralgia disappeared and vision returned to normal after median turbinectomy. In a man of thirty-three years with headaches and marked defect of vision in both eyes, x-rays showed opaque sphenoidal sinuses, and removal of the middle turbinals was followed by complete recovery. M. Lombardo.

Di Marzio, Q., and Ferreri, G. **Optic neuritis of sinus origin.** Riv. Oto-Neuro-Oft., 1932, v. 9, Sept.-Dec., pp. 541-720.

Of thirty cases eighteen were of retrobulbar neuritis, seven of optic neuritis with slight hyperemia or edema of the papilla, and five of incipient optic atrophy. Complete recovery was obtained in seventeen cases after operative treatment, recovery of vision in one eye in four cases, and nine either improved or remained stationary. More than half of the thirty cases showed no apparent trace of sinusitis either clinically or at operation. Some of the latent cases proved at operation to be cases of ethmoido-sphenoiditis. Only a few were chronic purulent maxillary or frontal sinusitis. The connection between the sinuses and the eye is explained by electivity of localization of germs of the original focus. Operative procedures gave the greatest percentage of visual recovery in the catarrhal forms in which no evidence of real sinusitis was found, while improvement was slow, incomplete, or late in the suppurative forms of sinusitis. (106 figures, list of references.) M. Lombardo.

Duverger and Verger. **Retrobulbar neuritis of nasal origin.** Riv. Oto-Neuro-Oft., 1932, v. 9, Sept.-Dec., pp. 726-729.

A woman of fifty-seven years complained of progressive diminution of vision of the right eye. Central vision

was reduced to 4/10. Anterior nasal examination revealed a mass in the left cavity, and at the posterior examination the mass appeared to be situated below the cranial base. The mass was radioresistant, and proved to be a myxoma with condromatous zones. Removal was followed by improvement of vision to 9/10. M. Lombardo.

Lambert, R. K., and Weiss, Herman. **Optic pseudoneuritis and pseudopapilledema.** Arch. of Neurology and Psychiatry, 1933, v. 30, Sept., p. 580.

The decision as to whether an eyeground is pathologic or normal is not always simple.

The authors discuss the pseudopapilledema sometimes found with marked refractive error, congenital deposits of glial tissue, and other puzzling appearances. If blind spot and angioscotomas are normal the appearance of the nerveheads can be dismissed as benign. The authors claim never to have examined a case of proved papilledema in which enlargement of the blind spots was absent. (Six case reports, six figures, thirteen references, discussion.)

Ralph W. Danielson.

Neuschüler, I. **Sinusitis with symptomatology predominantly radioocular.** Riv. Oto-Neuro-Oft., 1932, v. 9, Sept.-Dec., pp. 767-771.

A woman of forty-three years complained of pain in the left eye. The lids were swollen, the bulbar conjunctiva chemotic, the eye protruding. X-rays showed an opaque left frontal sinus, and the eye symptoms disappeared a few days after opening the sinus, which was found empty but with congested mucous membrane. In a man of thirty-eight years with severe diminution of vision of the right eye for one year and failing vision of the left eye for one week, nasal examination and transillumination were negative but x-rays showed opaque and enlarged sphenoidal sinuses; and after opening the affected sinuses the vision of the left eye returned to normal. M. Lombardo.

Pasternacki, B. W. **Optochin amblyopia.** Amer. Jour. Ophth., 1933, v. 16, Dec., p. 1102.

Santonastaso, A. **The chiasmatic syndrome and affections in the region of the sella.** Ann. di Ottal., 1933, v. 61, Sept., p. 689.

Cases are not infrequent in which the diagnosis of suprasellar tumor is warranted although radiogram shows no enlargement of the sella. On the other hand there may be almost complete destruction of the clinoid processes without hypophyseal symptoms. In the case reported, in a man of fifty-two years, there was descending optic atrophy without sellar symptoms. It was concluded that there was an initial hypertrophy of the gland which might be a true tumor or a simple hypertrophy with disturbed function and circulation of toxic products. Park Lewis.

Sargnon, A. **Optic neuritis of sinus origin.** Riv. Oto-Neuro-Oft., 1932, v. 9, Sept.-Dec., pp. 772-774.

The author discusses theories advanced to explaining improvement in ocular symptoms after endonasal operation. M. Lombardo.

Weill, G. **Attempt at classification of retrobulbar neuritis.** Riv. Oto-Neuro-Oft., 1932, v. 9, Sept.-Dec., pp. 721-725.

The author discusses retrobulbar neuritis due to multiple sclerosis, to nasal sinusitis, and to sellar tumor.

M. Lombardo.

Wolfkovitch, M. **The pathogenesis of so-called rhinogenic neuritis (experimental study).** Sovietskii Viestnik Opht., 1933, v. 2, no. 4, p. 405.

Infection of the sinuses was produced in one series of dogs by complete packing of one nostril and sewing of the anterior nares, and in another series by insufflation of powdered cantharides. The dogs were given a daily intravenous injection of five percent carmine, and were killed at various intervals after onset of the inflammatory process in the nose. Histologically they showed sinusitis with inflammation of the mucous membranes and bone necrosis spreading by way of the Haversian canals. In all cases the optic nerves showed nothing pathological and did not differ in staining from controls. The

author suggests that the symptoms attributed to rhinogenic retrobulbar neuritis are due to vasomotor disturbance in the central retinal vessels, having no relation to nasal disease; and that the improvement following nasal treatment is due to reflex action from the nasal mucous membrane. Ray K. Daily.

12. VISUAL TRACTS AND CENTERS

Alonso, A. F. **Traumatic lesion of cortical visual center.** Rev. Cubana Oto-Neuro-Oft., 1933. v. 2, March-April, p. 73. (See Amer. Jour. Ophth., 1933, v. 16, Oct., p. 940.)

Goldstein, K., and Jablonski, W. **The influence of tonus on refraction and vision.** Graefe's Arch., 1933, v. 130, p. 396.

In a woman of twenty years, an infectious process in the left ear was associated with serous meningitis in the left posterior cranial fossa, which had produced headache, vomiting, cranial pressure symptoms (Kernig, optic papillitis) and symptoms from involvement of the left acusticus, vestibular, trigeminal and facial nerves. There was an inclination of the head toward the right, and in this position, all the optic functions were better.

The visual acuity in this position was right 5/5, left 5/15, unimproved with lenses. On testing the vision in the old position with the head and trunk held straight, the best vision with the right eye was 2/4 with a glass of —6.00 D. sph. and with the left eye 1/40 with a lens of —8.00 D. sph. The latter measurements were confirmed by skiascopy with the head in the straight position. Under cycloplegia with one percent atropin solution, vision with a stenopaic opening was 4/60 without correction with the head straight.

The visual field for the right eye was about normal with the head in the inclined position but was definitely contracted in all directions when the head was held straight. In the straight position of the head, all objects observed appeared enlarged, and red and yellow colors showed peculiarities. These changes disappeared when the head was turned to its new normal or inclined position. H. D. Lamb.

13. EYEBALL AND ORBIT

Bérard and Peycelon. **A surgical study of Basedow's disease.** Arch. d'Opht., 1933, v. 50, Oct., p. 657.

Medical treatment only acts as a cure in mild forms. In all others surgical intervention is the only means of definite cure. Physical therapy is used only after operation or in inoperable cases.

M. F. Weymann.

Holm, Ejler. **Detachment of retina following an orbital phlegmon.** Det oftalmologiske Selskab i Köbenhavn's Forhandlinger, 1932, p. 15. In Hospitalstidende, 1933, Sept. 14. (See Section 10, Retina and vitreous.)

Peréz Llorca and Esteban M. **Microphthalmos and colobomatous cyst.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, Oct., p. 587.

There was apparent anophthalmos with a cyst of the lower lid. The excised cyst had a lining easily identifiable as retinal membrane, with inversion of the layers, and contained a small eyeball with all its parts. Sectioning of the globe showed a coloboma. There was no vitreous identifiable in cyst contents outside of the globe, and this is in favor of Gallemaerts' schema of the formation of such anomalies rather than Mann's. (Illustrated.) M. Davidson.

Sanyal, Saradindu. **Study of a case of melanosis oculi.** Calcutta Med. Jour., 1933, v. 28, July, pp. 1-21.

The author reviews the literature. A twenty-three-year-old medical student had melanosis of the right eye. With the biomicroscope pigment could be seen even in the cornea. Photometric studies did not reveal any essential change in light difference, but the light minimum was raised. (Four colored figures, eight tables and graphs, forty-eight references.)

Ralph W. Danielson.

Sená, J. A. **Pulsating exophthalmos.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, Oct., p. 597.

In a case of pulsating exophthalmos of traumatic origin, with fracture of the outer orbital wall and of the optic fora-

men and immediate amaurosis and subsequent optic atrophy, satisfactory results are reported from the use of intragluteal injections of gelatin-serum, combined with rest and periodic carotid compression. The exophthalmos was reduced from 6 to 2 mm., and there was incomplete disappearance of bruit and pulsation after two months of weekly injections. (Illustrated.)

M. Davidson.

14. EYELIDS AND LACRIMAL APPARATUS

Bursuk, G. G. **A modification of the transplantation operation for trichiasis.** Sovietskii Viestnik Opht., 1933. v. 2, no. 3, p. 251.

Instead of transplanting into the intermarginal space a piece of mucous membrane from the lip, the author uses in women a piece of skin from the lower portion of the breast, and finds the substitution very satisfactory and less disagreeable to the patient. This region is devoid of hair follicles and is highly vascular, and the transplant takes well.

Ray K. Daily.

Comas, C. and Cepero, G. **Electrolysis in stenosis of the lacrimonasal duct.** Rev. Cubana Oto-Neuro-Oft., 1932, v. 1, Nov.-Dec., p. 407.

Electrolysis combined with sounds and lavage has shortened duration of treatment, improved prognosis, and made extirpation unnecessary. (Ill.)

M. Davidson.

Deggeler, S. **A few remarks on complications in extirpation of the lacrimal sac.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 270.

The rich venous supply of the region of the lacrimal sac is conducive to development of thrombophlebitis with complications such as orbital abscess and even meningitis. The fortunately rare occurrence of these complications is due to rapid diminution in the bacterial content with extirpation of the sac, to low bacterial virulence in cases of chronic dacryocystitis, to development of an immunity against the microorganisms, to excellent nasal drainage, and to active postoperative hyperemia.

Ray. K. Daily.

Epstein, B. **The "wild glance" of nurslings.** Med. Klin., 1933, v. 29, July 21, p. 1010.

In a group of neuropathic infants the author observed lid symptoms corresponding to the Dalrymple or Graefe sign. The lids were widely separated, so that the child had an excited or frightened expression. In most cases the appearance was present only occasionally and varied in intensity, being more pronounced when the child was irritated or was disturbed in general health. Beulah Cushman.

Esteban, M. **Infection of the lacrimal canaliculi.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, Jan.-Feb., p. 49.

The author calls attention to occasional persistence of a canaliculitis with ectasia of the walls, after sac extirpation; and suggests treatment.

M. Davidson.

Kantor, D. B. **The operation of Sie-Boen-Sian.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 292.

Because of its technical simplicity the author finds this modification of the Panas operation for trachomatous entropion and trichiasis particularly suitable to rural clinics. The technique consists of an incision through the conjunctiva and tarsus 2.5 mm. from the ciliary border; freeing the distal portion of the tarsus from the muscles and skin; and passing three doubly armed sutures from the lower lip of the conjunctiva through the tarsus to the skin at the lid margin. This straightens the lid and relieves the trichiasis. Ray K. Daily.

Rubbrecht, R. **Some remarks on the operation of Toti.** Ann. d'Ocul., 1933, v. 170, Nov., pp. 958-961.

The author pleads for dacryocystorhinostomy. He urges the selection of a good bone-cutting forceps, this type of instrument being easier and quicker to use than the trephine. Also, it is safer as well as being less objectionable to the patient than the gouge.

H. Rommel Hildreth.

Satanowsky, P. **Congenital partial cryptophthalmos with epicanthus and**

ptosis of upper lid. A new surgical procedure. Arch. de Oft. Hisp.-Amer., 1933, v. 33, Nov., p. 643. (See Amer. Jour. Ophth., 1933, v. 16, Dec., p. 1140.)

15. TUMORS

Larsen, V. **Metastatic cancer of the iris.** Acta Ophth., 1933, v. 11, no. 3, p. 386.

To a tabulated synopsis of fourteen cases reported in the literature the author adds his own. A man of fifty-eight years, with an esophageal neoplasm, developed in the right iris a rapidly growing metastatic tumor which on postmortem examination was found to be a spinocellular carcinoma. Of the fourteen earlier cases, thirteen were secondary to involvement of choroid or ciliary body; but in this case neither choroid nor ciliary body was involved. The average duration of life after discovery of the metastatic focus in the iris was four months; in choroidal metastasis it was eight months.

Ray. K. Daily.

Oguchi, Tadawo. **A case of melanosarcoma of the optic papilla.** Graefe's Arch., 1933, v. 130, p. 427.

A man of twenty-one years had pain and vision reduced to 0.5 in the left eye. The ophthalmoscope showed an intensely pigmented tumor in the position of the optic disc, its vertical dimension about 2.5 to 3, the horizontal about 1.5 to 2 disc diameters, and projecting 4 D. from the surface of the retina. The visual field for this eye was concentrically contracted to less than 30°. Sections of the enucleated eye showed the tumor to extend back into the nasal part of the optic nerve. It was composed partly of spindle and partly of round cells and was very intensively pigmented. The choroid was not involved.

H. D. Lamb.

Pressburger, Erich. **Eye lesions in leucosarcomatosis of Paltanf and Sternberg.** Zeit. f. Augenh. 1933, v. 81, Oct., p. 308.

Paltanf and Sternberg distinguish leucosarcomatosis from leukemic lymphadenosis by the malignant proliferation of lymphatic tissues, and from aleukemic lymphadenosis, to which it is closely related, by the blood picture. Eye changes have not been reported. In a patient observed by the author there were exophthalmos and diplopia as well as general findings of leucosarcomatosis. Multiple discrete swellings were found under the skin of the face. The choroid was irregularly thickened by infiltration with myeloid cells, and contained many areas of necrosis.

F. Herbert Haessler.

Suchanov, A. **A primary round-cell sarcoma of the upper lid.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 297.

To nineteen cases collected in the literature the author adds his own. The neoplasm was situated in the left upper lid of a twenty-seven-year-old woman, and the diagnosis was made histologically after surgical removal. The immediate recovery was uneventful, but the final result is not stated.

Ray. K. Daily.

NEWS ITEMS

News items in this issue were received from Drs. W. F. Boiler, Iowa City, Iowa, and E. G. Gill, Roanoke, Va. News items should reach **Dr. Melville Black, 424 Metropolitan Building, Denver, by the twelfth of the month.**

Deaths

Dr. Dero Eugene Seay, Dallas, Texas; aged fifty-nine years, died, November 16.

Dr. Eustace Monett Singleton, Marshalltown, Iowa; aged sixty-nine years, died, November 29.

Dr. James Cole Hancock, Brooklyn; aged sixty-eight years, died, November 27, of heart disease.

Miscellaneous

The eighth annual spring course in ophthalmology, otolaryngology and allied subjects will be given, April 9-14, by the Gill Memorial Eye, Ear and Throat Hospital, Roanoke, Va. Particulars relative thereto can be had from Dr. E. G. Gill.

A committee appointed at the December meeting of the Illinois Advisory Board of Public Health recommended that the treatment of patients with trachoma be discontinued by the state department of health and that, instead, its activities in this connection be resricted to education in prevention of the disease.

In accordance with a resolution of the Czechoslovak Ophthalmological Society at its meeting in Prague last May, the proceedings of that society are being published in a new journal devoted entirely to ophthalmology, Ceskoslovenska Ofthalmologie. This takes the place of the former annual volume of the society, Ofthalmologicky Sbornik.

Prof. Anton Elschnig will conduct a course on intracapsular extraction of cataract, beginning February 27, under the auspices of the Chicago Ophthalmological Society. Operations on patients before groups of not more than ten registrants will follow an illustrated lecture that afternoon. On February 26, Dr. Elschnig will address the society on "Extraction of the Lens in Myopia." For further information, address Dr. Theodore M. Shapira, 58 East Washington Street, Chicago.

The University Eye Clinic in Utrecht is celebrating this year its seventy-fifth year of existence. It was founded in 1858 under the leadership of the famous physiologist and ophthalmologist, F. C. Donders, friend of Helmholz and Graefe. He was succeeded in 1883 by H. Snellen, Sr. (of test-type fame), who again was succeeded by his son, H. Snellen, Jr., in 1903 (the latter retiring in 1928). The present incumbent of the clinic is Professor H. J. M. Weve, whose name is well known in this country in connection with his diathermy operation for retinal detachment. In connection with the jubilee Professor Weve has prepared a richly illustrated memorial volume of 238 pages, the frontispiece to which is a reproduction of the oil painting of Donders which hangs in the clinic. The memorial volume is issued by Joh. de Liefde, Utrecht.

The New York State "Department of Social Welfare, Division for the Blind" in cooperation with New York University offers a course called "A survey of eye conditions." The dates for the course are February 6 to May 17. The purpose of the course is to present a comprehensive body of knowledge on the eye, and eye conditions, in such a way as to be of value to workers in various fields of general welfare. Registration is to be made at the office of the School of Education (35-41 Fourth St., Corner Green Street) Washington Square.

It has recently been ruled by the Civil Service Commission that attending surgeons and associate surgeons of the Illinois Eye and Ear Infirmary must have the certificate of the American Boards of Ophthalmology or Oto-Laryngology. This is of considerable significance as being the first official governmental recognition of the Boards and is one more indication of the increasing importance of the certificate from the Boards to ophthalmologists and oto-laryngologists.

Societies

At the meeting of the Iowa Academy of Ophthalmology and Otolaryngology held in December, the following officers were elected: Drs. W. F. Boiler, Iowa City, president; D. M. Lierle, Iowa City, vice-president; and L. A. Taylor, Ottumwa, secretary and treasurer.

Personals

Dr. George S. Crampton, Philadelphia, gave an illustrated lecture on the manufacture of ophthalmic lenses at the new Franklin Institute, December 20.

On New Year's day Dr. and Mrs. Park Lewis celebrated with a reception at the Hotel Statler, Buffalo, the one-hundredth birthday of the doctor's father, Mr. John Wesley Lewis.

Dr. Clarence King has been appointed professor and head of the department of ophthalmology at the University of Cincinnati College of Medicine, to succeed Dr. Victor Ray who has been made professor emeritus.

Friends of Dr. William H. Wilmer will regret to hear that he has retired as director of the Wilmer Institute of Ophthalmology at Johns Hopkins. This action was taken to comply with regulations providing that professors leave the faculty when they reach the age of seventy years.